ARCHIVES OF OTOLOGY.

PERICHONDRITIS AURICULÆ.

By H. KNAPP, of New York.

(*With two engravings.*)

THE inflammation of the perichondrium of the ear is, it seems to me, quite inadequately described in the text-books of otology. Many authors, as far as I can establish by a cursory review of their works, do not mention it at all. Among them are Lincke, Itard, Wilde, Burnett, Moos, Trœltsch. Others speak of it only incidently and in short passages; for instance, Roosa (1st edition, 1873, p. 113): "Any inflammation of the integument, connective tissue, and cartilage of the auricle, leading to effusion of serum, blood, or the formation of pus, will be apt to cause a deformity of the part." Then a sketch from a photograph is given, "as a result of what was first an inflammation of the cartilaginous portion of the auditory canal. A polypus formed from the prolonged use of poultices, the inflammation extended to the tissue of the auricle, and after a long period of suffering, during which small abscesses were formed, which were evacuated after pursuing a sinuous course in the integument, the auricle obtained the shape which is here shown." The figure shows the helix normal, the anti-helix and concha replaced by a uniform intumescence, but which is not in conformity with what I have observed; the lobule, also, is greatly swollen. The case is reported in full in the Transactions of the American Otological Society, 1873, pp. 123 *et seq.*, and is not representative of the affection here under consideration.

L. Turnbull, p. 132, says: "The cartilage of the ear may

be broken by crumpling up the auricle forcibly and suddenly; in these cases there is more or less inflammatory action, accompanied with pain and subsequent deformity."

The majority of authors mention the inflammation of the perichondrium under the head of the much-discussed othæmatoma, with which, by Kramer and others, perichondritis auriculæ is used as a synonymous term. The description then unfolds the well-characterized picture of the hæmatoma auris. With this affection the idiopathic inflammation of the perichondrium of the ear should not be identified.

I remember having seen only three cases of perichondritis auriculæ, of which only one showed the disease in all its phases. It was as follows:

The patient, Henry A.,* of New York, was sixteen years of age, and had always enjoyed good health. On August 29, 1879, he presented himself to me at the Dispensary of the New York Ophthalmic and Aural Institute, complaining of a moderately painful swelling in his right ear, which he had first noticed a few days previously. His ears had never before given him any trouble, and he could not ascribe the present difficulty to any cause. I found the external portion of the meatus slightly red and uniformly swollen, so as to obliterate its calibre. When the auricle was drawn back, the canal was opened to a certain degree; no ulcer or discharge was discovered; and the hearing was good. The swelling was most pronounced on the anterior-lower part, where also fluctuation was discovered. The case was entered as furuncle of the external meatus, and the fluctuating part was opened, evacuating, however, not creamy, but watery pus. A week later the swelling in the canal had diminished, but the lower part of the concha was red, swollen, and indistinctly fluctuating. After three days the swelling in the concha had increased, showed distinct fluctuation, and was moderately painful on pressure. It was opened, and again watery pus escaped. Four days later the swelling filled the whole concha, was dark-red, and had a doughy feel. I opened it above the lobule, which was unaffected, with a

* He was presented with a few remarks at the meeting of the American Medical Association (Section on Ophthalmology, Otology and Laryngology), held at New York, June 3, 1880. In the discussion, Drs. McKay and Risley, of Philadelphia, mentioned each one case of perichondritis auriculæ they had observed (see Dr. S. M. Burnett's report further on).

Beer's knife, and let out, as before, a viscid fluid, with denser yellowish flakes. A probe, introduced through the opening, could be pushed more than half an inch upward. The cartilage felt hard and uneven, the perichondrium was detached from it, and could, together with the skin, be easily raised by the probe. I now inserted a small silver drainage tube, which was cleansed and re-introduced twice daily. The ear was covered with picked linen, held by a flannel roller. There was moderate discharge of thin and flaky pus from the wound.

The swelling crept slowly and steadily over the whole anterior

FIG. I.

surface of the auricle, excepting the lobule. In some places it was diffuse, in others nodular and fluctuating. These places were always lanced, and the same thin viscid pus came out, as on the first opening, *never any blood.* In the fourth and fifth weeks the helix and posterior surface of the auricle were swollen, but did not fluctuate. At the beginning of the sixth week the swelling had attained its height, and is represented by the photograph taken at that time. The helix is swollen, the fossa helicis preserved only in its upper part. The remainder of the auricle presents one uneven, nodular, reddish swelling, which ceases ab-

ruptly at the upper end of the normal lobule. The tragus also is swollen and misshapen, and in front and below it there is a package of enlarged glands to be seen and felt. The whole pinna is considerably enlarged, having about 1½ of its normal dimensions. For some weeks the meatus had been found moist, with a scant puriform discharge, upon which I laid no great stress, as the patient had no pain and his hearing was good when I drew the auricle back. I was of opinion that the discharge probably came from the openings in the auricle. By probing I found that the perichondrium was very extensively detached

FIG. II.

from the cartilage, and with a sharp spoon I scraped out some granulating tissue.

From the sixth week the swelling began to subside, first in the cartilaginous portion of the meatus, then in the concha, then on the posterior surface which had been free from suppuration, and gradually all over the auricle. The tragus assumed its natural size, the pre-auricular glands disappeared completely, the openings in the anterior surface of the auricle ceased discharging and closed, the auricle shrunk and remained irregularly corrugated. The antihelix, the fossæ antihelicis and scaphoidea and

the greater part of the concha had disappeared and were replaced by hardish nodules and ridges. The helix was considerably atrophied. The whole misshapen auricle was pressed against the skull, and measured scarcely two-thirds of its natural size. Only the lobule escaped the deformity, because it had never participated in the inflammation. The whole inflammatory process lasted ten weeks.

The present condition of the ear is represented by Fig. ii, a photograph taken May 26, 1880.

On May 30th I examined the patient again, and found, to my surprise, that he had a small perforation in the lower part of his drum-head. He had noticed no discharge for a long time, and believed his hearing as good as in the other ear. I found the canal normal but the membrana tympani unclean. Syringing brought out a few scales, but the absorbent cotton, wound around the knob of an Anel's probe, was moist with pus. By inflation with the catheter, the air could be distinctly heard to pass through the drum-head. Catarrhal pharyngitis was present. When these complications occurred is not noted in the record book. They were surely not present at the beginning of the disease, for at that time the canal was clean, the membrana tympani normal, and the swelling localized to the cartilaginous portion of the canal, as was carefully determined with the speculum and the probe. At present the hearing power in the affected ear is $\frac{3}{24}'$ for the watch, and $\frac{2}{20}$ for whispering voice. The other ear is normal. In the course of four weeks the scant discharge disappeared altogether, and the *Mt* appeared entire. The auricle, however, was still more shrunken.

The *second case* of this disease that came under my notice was seen only once. It was some years ago, in a young lady of about seventeen years of age, who was healthy and could not attribute the difficulty to any special cause. Her ear looked exactly like that of the case just described in its fourth week. The concha was filled up and there was distinct fluctuation. I proposed to draw a seton through the swelling, between integument and cartilage, and pencil the auricle with traumaticin. The patient and her mother did not consent to this mode of treatment, and disappeared from view.

The *third case* was shown me a few months ago, by Dr.

R. C. Brandeis, at the New York Ophthalmic and Aural Institute. In one of our common patients who suffered from a mild chronic aural catarrh with pronounced pharyngitis, the same kind of reddish diffuse swelling developed in the cartilaginous portion of the meatus and the adjacent part of the concha, which was noted at the beginning of the first case. Dr. Brandeis at once made a large and deep opening, and watery pus escaped. The swelling in this case did not increase after the incision, but disappeared in the course of a few weeks.

When I demonstrated the first case to the class of students at my clinic, and pointed out the peculiar features of perichondritis auriculæ, Dr. T. R. Pooley informed me that, during my absence, he had observed a case entirely similar to mine. The photograph of it which he showed me was exactly like the first from my patient. The lobule had in his case also remained unaffected.

This is all I know on this disease from personal experience. I have seen a few cases of hæmatoma auris, but they were, in their first stages, totally different from those under consideration. The swelling was markedly round and dark-blue, and on incision, dark blood was evacuated. They ran a very slow course, showing hemorrhagic swelling in the neighborhood of the first intumescence, which led to temporary sero-purulent discharge and permanent deformity of the auricle. The later stages were evidently also of an inflammatory nature. They occurred in sane people, and were not attributable to any injury.

In journals I find the following observations:

1. *A case of inflammation of the perichondrium with formation of an abscess in the left auricle.* By Dr. R. Chimani, *Arch. f. Ohrhk.* Vol. ii., pp. 169–171. 1867. Without any assignable cause, the concave surface of the auricle became painful, red, and so much swollen that on the fourth day all elevations and depressions had disappeared. For three days the ear was poulticed, and fluctuation manifested itself over the whole swelling. A large vertical incision evacuated a synovia-like liquid mixed

with pus. The cartilage was laid bare, and on probing, its integument was found detached to the whole extent of the concavity of the auricle. The abscess cavity was syringed with lukewarm water twice daily, and dressed with charpie and cotton wadding. The surrounding œdema soon disappeared; the depth of the ear-canal showed nothing extraordinary; the membrana tymp. was slightly reddened. From the tenth day the diminution of the abscess cavity, beginning at the periphery, by reunion of the perichondrium to the cartilage, was manifest, and in twenty-four days the cavity was completely closed. The auricle had regained its shape and elasticity, and no deformity was left.

This case, ending in perfect recovery, differed from the one related above, inasmuch as only one large abscess on the concave side of the auricle was found, which closed after an extensive incision, whereas in our case a circumscribed furunculous swelling occurred in the cartilaginous part of the ear-canal, and from there the inflammation crept slowly over the whole cartilaginous portion of the auricle, forming, successively, a number of small abscesses on its anterior side, leaving the organ misshapen and considerably swollen.

A case reported by Dr. O. D. Pomeroy, of New York, in the Transactions of the Am. Otol. Soc., 1875, pp. 83 *et seq.*, and reviewed in the 11th volume of the *Arch. f. Ohrenh.*, evidently belongs to this class of inflammation. Its title is: "Multiple abscess of the auricle, resulting in partial destruction of the cartilage, developed from a middle and external otitis, and somewhat resembling an othæmatoma." Dr. Mathewson, who saw the case first, "always considered it one of perichondritis," and Dr. Pomeroy says: "This case seems to me to be quite unique." He illustrates his communication with three drawings, the first of which is almost identical with the first in the case above reported, and the last (after recovery) is again quite like our second engraving. In Dr. Pomeroy's case the inflammation had gone farther than in ours, "a large abscess occupying the region of the concha and extending upward, downward and

backward, so as to involve about half the area of the auricle. It pointed in front and behind, causing the auricle to be inserted on the side of the head at about right angles." The disease lasted several months, and Pomeroy concurred in the opinion of Mathewson "that the abscesses depended on a perichondritis." One feature upon which I lay great stress as to the differential diagnosis of the disease under consideration, is not mentioned by Dr. Pomeroy, but its presence is distinctly demonstrated by his engravings (which were taken from photographs), namely, *the integrity of the lobule.* In all kinds of diffuse inflammation of the ear-canal, the auricle, and its surroundings, I have seen the lobule participate in the morbid process; in cases of perichondritis it remains unchanged, from the simple reason that the lobule of the ear has no cartilage.

CONTRIBUTIONS TO THE PATHOLOGY AND PATHOLOGICAL ANATOMY OF THE ORGAN OF HEARING.

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THERE are two affections of the ear the frequent occurrence and practical importance of which may justify me in communicating the following observations made at the General Hospital of this city. I refer to: 1st, the presence of foreign bodies in the auditory meatus; and, 2d, otitis media purulenta, vulgo "otorrhœa."

While the former (the presence of foreign bodies) is mostly harmless in its nature, and of no significance for the organism,* generally not giving rise to the development of serious symptoms until after faulty attempts at extraction; the dangers of suppuration of the ear to health and life of the affected persons have long been sufficiently recognized by physicians, although even now the view may still be encountered that otorrhœa should be regarded as a *noli me tangere*, and that it is wrong to suppress it forcibly. Whoever has had the opportunity of observing at the dissecting table the sequelæ of chronic suppuration of the middle ear, will easily convince himself of the falsity of such a view, and it shall be the object of the following communications, in connection with *post-mortem* results, to point out anew the great importance of purulent otitis media.

* Von Trœltsch: Lehrb. d. Ohrenheilkunde, 5th ed. (German), 1873, p. 467.

It is pre-eminently Lebert's* merit to have demonstrated "how otitis interna has shown itself as a frequent complication and cause of cerebral suppuration," and since the appearance of his article, in 1856, the literature on this subject has been very extensive. A compilation of the communications in this department of pathology, during the last decade from 1869, has furnished me 21 cases in which cerebral abscesses occurred in consequence of purulent otitis media.

Of these, Schwartze† reports four cases (three in the cerebrum, one in the cerebellum); Wendt,‡ five (three in cerebrum, one in cerebellum, one in the pons); v. Trœltsch,§ three (in cerebrum); Moos,‖ two (right temporal and cerebellar lobe; cerebrum); Odenius,¶ three (two of which in the cerebellum); Olliver,** Thompson†† Rüpper,‡‡ and Wreden,§§ each one case (all in the cerebrum). I myself, in the short period of one year, have seen five cases of purulent otitis media complicated with cerebral abscesses; three of which, occurring in the cerebrum, I beg leave here to report.

I.—OTORRHŒA OF LONG STANDING; EXACERBATION OF THE INFLAMMATION FROM SYRINGING OF THE EAR CANAL; MENINGITIC SYMPTOMS; DEATH IN EIGHTEEN DAYS.

AUTOPSY.—*Left-sided purulent otitis media; defect of the membrana tympani: thrombo-phlebitis of the transverse sinus; abscess in subdural space and in left temporal lobe; purulent lepto-meningitis of the base and the convexity.*

Magdalen Behnck, servant, æt. 23, states to have syringed the

* On Cerebral Abscess, Virchow's *Arch.*, p. 78 *seq.*

† *Arch. f. Ohrenhlkde.*, Bd. iv, p. 235; *ibid.*, N. F., Bd. ii, p. 279; *ibid.*, Bd. xii, p. 113, and Bd. xiii, p. 89.

‡ *Arch. d. Heilkde.*, Hft. 3 and 6, 1870.

§ *Arch. f. Ohrenhlkde.*, Bd. iv, p. 97.

‖ ARCH. OF OPHTH. AND OTOL., vol. iii, p. 76; Virchow's *Arch.*, Bd. xxxvi, p. 501.

¶ Reference in Virchow-Hirsch, f. 1867, Bd. i, p. 222; Bd. ii, p. 511.

** *Gazette médic. de Paris*, No. 17, 1870.

†† *Med. Times and Gazette*, March 29, 1873.

‡‡ *Arch. f. Ohrenhlkde.*, Bd. xi, p. 16.

§§ *Petersburger Med. Zeitschrift*, No. 14, p. 291, 1868.

right ear for years on account of impaired hearing. Two weeks before admission she did the same to the left ear; since then has suffered from violent headache, vertigo, vomiting, and purulent discharge.

Status præsens.—December 5th, the day of admission, patient is hard of hearing; the left auditory meatus, discharging a purulent fluid, is greatly narrowed, does not permit the introduction of a speculum; pupils equally wide, promptly reacting to light. Temperature moderately febrile; pulse 80. *Therapeusis.*—Syringing of the ear, ice-bladder to the head, bitter-water.

December 6th.—Patient very restless at night; sensorium clouded, but reasonable answers are given to loud calls. Nucha and spine stiff; attempts to bend them cause pain. No paralytic symptoms; urine voided spontaneously; pulse and temperature as before.

December 7th.—Mouth slightly drawn to the left; the tongue, on protrusion, deviates somewhat to the right; pupils equally wide, reacting normally. Temperature somewhat lower than yesterday.

December 8th..—Sensorium very clouded; the paralytic symptoms which were observed yesterday are absent to-day. Temperature falling, pulse 60. In the afternoon, the patient suddenly becomes cyanotic; respiration ceases under tonic spasms, while the heart continues beating in regular rhythm. Artificial respiration by faradization of the phrenic nerve; there are no spontaneous attempts at breathing. Half an hour later, the cardiac contractions, increasing in frequency, are ceasing; death at 2.30 P.M.

AUTOPSY, *December 9th*, twenty-four hours after death: Stout female cadaver; rigor mortis well marked. Vault of the skull longitudinally oval, symmetrical; with sutures preserved and slightly bloody diploë; dura relaxed, dark fluid blood in its upper longitudinal sinus; inner surface of the dura, at the convexity, glistening like a tendon. On removing the brain, the dura investing the left tegmentum tympani projects to about the size of a hazel-nut, owing to the pus beneath; at the apex of the detachment the dura is necrosed, and blunt instruments easily penetrate through it to the completely denuded bone. The left transverse sinus, from the torcular to the sigmoid fossa of the mastoid process, compactly filled with a firm, grayish-red coagulum, firmly adhering to the walls; the dura above and below the thrombosed

transverse sinus, especially in the lower section of the posterior cranial fossa, is covered with thin, grayish-yellow, easily detached fibrinous pseudo-membranes. The remaining sinuses of the base of the skull are partly empty, partly containing fluid blood.

The roof of the drum cavity stained a dirty yellow, lack-lustre, nowhere showing any loss of substance; after chiselling off the anterior-inferior walls of the auditory meatus, its posterior half is seen to be filled with polypoid vascular excrescences which may be followed into the drum cavity; membrana tympani absent. The malleus and incus are found in the midst of the discolored polypoid excrescences in the drum cavity; their surfaces are lustreless and rough; both still articulated together; stapes absent. The mucous membrane of the bony portion of the Eustachian tube is dirty-green; vestibule and labyrinth, also the internal meatus and the acoustic and facial nerves, are unaltered. Mastoid process of ivory hardness—osteo-sclerosed.

Corresponding to the detached portion of the dura situated above the roof of the left tympanic cavity, the brain substance (at the temporal lobe) is depressed, green, and of softish consistence; the pia also appears discolored at this place. On incising the just-mentioned portion of the temporal lobe, a cavity is encountered, the size of a small hen's egg, having smooth, bright yellowish-gray walls, containing about half a tablespoonful of creamy, greenish pus. The white brain substance surrounding this cavity, in a zone 1 *cm.* broad, is interspersed with densely crowded, punctiform ecchymoses. At the wall limiting the abscess inferiorly, the brain substance is barely 2 *mm.* thick; toward the left lateral ventricle the abscess is bordered by a layer of white substance, 1 *cm.* in thickness, semi-fluid, interspersed with multiple punctiform ecchymoses, and stained a dirty yellowish-white. The pia mater at the base of the brain shows diffuse purulent infiltration; also the cranial nerves, starting here from the large ganglia until they are lost to sight, are surrounded by a purulent exudation. The larger venous vessels of the pia mater, as well as those at the convexity of the cerebrum, are bordered by narrower and broader stripes of purulent exudation. In the left ventricle, especially in the inferior and posterior part of the brain, there is a teaspoonful of thin-fluid, purulent liquid; the left choroidal plexus, particularly its glomus, is invested with a tubular pseudo-membrane of a slightly yellowish color, after the removal of which, the opacified, somewhat swelled ependyma pro-

trudes. The floor of the fourth ventricle is covered with a thin layer of yellow pus, mingled with small shreds, and extending into the nidus hirundinis; after this has been washed off with a stream of water, the smooth ependyma becomes visible.

In the thorax and abdominal cavity, nothing of importance.

Among those facts which are deserving of special mention in the discussion of the preceding case, appears to me, in the first place, the *beginning of the exacerbation* of the chronic affection *in connection with a syringing of the ear.* But the possibility of evil consequences of that nature in the train of a manipulation which, in medical practice, is mostly left to inferior nurses, imposes the duty upon the physician to bestow sufficient care upon this apparently indifferent assistance; and, if left to a third party, to insist on the strictest carrying out of the precautions to be observed.* v. Trœltsch also considers, in one of his three cases (*A. f. O.*, iv), a too vigorous syringing of the ear as an etiological factor in the development of a fatal brain affection (meningitis, cerebral abscess, etc.).

Among the other, in general quite clear anatomical relations of the case, I would only point to one fact, *i. e.*, the duration of the above-described cerebral abscess, which, in a certain sense, contradicts the clinical observation. According to the clinical history, the whole process, from the beginning of the headache, ran an exceedingly acute course, namely, within seventeen days; while the condition of the abscess—I refer to its limitation toward the surroundings—points to a longer existence of the affection on account of a developed, though thin membrane (compare the preceding remarks), "because," according to Lebert,† "the commencement of the formation of a sac may be put, approximatively, into the course of the third and fourth weeks." Lallemand, indeed, maintains to have found once, already at the thirteenth day, a soft enveloping membrane; and, on the other hand, the possibility remains that the abscess in our case may have existed in a latent form already before

* Comp. Schalle: Bericht über die Ohrenstation im Garnisonlazareth in Dresden; *Arch. f. Ohrenh.*, vol. xii.

† L. c., p. 100.

the onset of the cerebral symptoms, as it has been described in a whole series of cases reported by other observers.

The complete occlusion of the left transverse sinus by an adherent thrombus which the autopsy demonstrated, caused clinically, during the presence of the patient in the hospital, no symptoms whatever, unless we might be inclined to refer the complaints about headache, at least in part, to this anatomical substratum.*

II.—CHRONIC INFLAMMATION OF THE RIGHT MIDDLE EAR; APPEARANCE OF CEREBRAL SYMPTOMS AFTER A KNOCK ON THE HEAD; DEATH DURING INCREASE OF THE CEREBRAL AFFECTION.

AUTOPSY.—*Purulent right otitis media without perforation of the membrana tympani; absence of the incus; caries of the petrous bone; abscess of the right temporal lobe; thrombo-phlebitis of the right transverse sinus.*

August Harde, laborer, æt. 22, admitted to the General Hospital of this city, on August 7, 1878, states to have hit his right temple against a beam without having sustained a visible injury. Ever since that time he complains of violent headache which he at first referred to the left temple, later, mainly to the back of the head. About a week ago, the pain grew so intense that patient had to give up his work and take to his bed. During this time he continually complained of his head, and is said to have been delirious for a time; the appetite was impaired; stool retarded; for periodical retention of urine poultices were employed with good effect.

Status præsens.—Patient, on admission, presents a typhoid condition; T. 38°, P. 60, full and tense. In answer to questions he complains loudly of his head; no further statements could be got from him. The bladder, which was distended above the umbilicus, was relieved by the catheter of 1200 *ccm.* of turbid alkaline urine of ammoniacal smell. Further objective conditions are absent. *Treatment:* Ice bladder to the head, water cushion, cognac mixture internally.

The state of the patient remained nearly unchanged; the alka-

* Comp. Lebert: "Ueber Entzündung der Hirn-Sinus." Virchow's *Arch.* Bd. x, p. 381 *seq.*, especially p. 401.

linity of the now spontaneously voided urine grew less after the internal administration of a solution of chlorate of potassa; the tongue appeared moist, fuliginous; abdomen soft, not tender; stools obtainable only through enemata. While the temperature on the 8th and 9th did not exceed 37.4°, there ensued on the afternoon of the 10th a rise to 38.2°, and with a further rise up to 39.5° on the morning of the 11th, death ensued, somnolence having increased and breathing having become surprisingly stertorous; shortly before death a distinct difference in the pupils had taken place.

AUTOPSY, twenty-six hours after death: Body well nourished; vault of the skull thin, the dura mater especially injected and not adherent to the vault; pia mater thin, transparent, also at the base of the brain. Vessels of the pia mater and base of the brain moderately filled. After the easily effected detachment of the pia, the gyri of both cerebral hemispheres appear greatly flattened. On removing the brain, the substance of the right temporal lobe tears, and several teaspoonfuls of a green, fetid pus mixed with flakes are discharged. Gray brain substance soft. In the right temporal lobe, there is an abscess the size of an apple, filled with the pus just described, limited by ragged walls and not communicating with the corresponding lateral ventricle. Both ventricles enlarged and filled with clear serum. The right transverse sinus obstructed in its course in the sigmoid fossa, as far down as the foramen jugulare, with a firm adherent thrombus which in its centre shows red softening.

Further examination of the right temporal bone, removed from the base of the skull, exhibits the following: Dura thickened over the tegmen tympani, detachable with difficulty, lustreless on its cerebral surface, covered with thin pseudo-membranes. The roof of the drum cavity shows a loss of substance, about the size of a dime, leading directly into the drum cavity; the margins are ragged, and the bone around it shows a grayish-yellow discoloration. After cleansing the drum cavity of semi-fluid, aggregated gray masses, which, microscopically examined, consist of fat-granules, detritus, needles of margarine, and sparse crystals of cholesterin, we recognize at the posterior surface of the pyramid of the petrous bone a second loss of substance, the size of a large lentil, situated closely below the most posterior part of the upper edge of the petrous bone; its margins likewise are rough, and it communicates with the one first mentioned. Of the ossicles, the malleus and

stapes, surrounded by vascularized pseudo-membranes, are retained in their places; the incus is absent. The membrana tympani is thickened, but present in its totality. Tube and external meatus unaltered. The nerves entering the inner auditory meatus are intact, vestibule and cochlea likewise.

The two cases above described have many features in common, among which the primary affection, chronic purulent inflammation of the middle ear, must be first emphasized; remarkable, furthermore, is the sudden exacerbation after an injury, in connection with which it should be pointed out that in the last-described case, even the origin of the entire disease has been traced back to the trauma; finally, as a factor common to both should be mentioned the fatal termination by cerebral abscess, in consequence of the affection of the petrous bone. One essential difference between the two cases, however, is to be sought in the condition of the membrana tympani which was destroyed in Case I, but wholly preserved in Case II. To this circumstance it should obviously be ascribed that the process here took so deleterious a course; it shows why it progressed to so extensive a destruction of the petrous bone; for having no outlet except by the E. tube, which very rarely serves for that purpose, the pus was retained in the drum cavity* in a state of regressive metamorphosis, caused the formation of the above-described plugs, which, acting as foreign bodies, added, by the continuous pressure they exerted on the walls of the drum cavity, a new disturbance of nutrition, and in this way brought about a necrosis of the bone with disintegration at the places designated. The development of the cerebral abscess, in connection with the affected bone, needs no further explanation; the formation of thrombi, with subsequent softening, caused by inflammation of the walls of the transverse sinus, is also easily understood.

The assumption that the formation of the abscess is an immediate consequence of the injury mentioned in the clinical history, is to be disproved by the anatomical condition of the abscess; for the latter, in accordance with the ragged aspect of its walls, with the but slightly distinct limitation

*Comp. v. Trœltsch, Lehrbuch, p. 409.

toward its surroundings, is of more recent date than the contusion received weeks before, which would have left behind some pigment remnants in the centre of the patch as residues of the capillary apoplexies, to which a purulent disintegration must have succeeded, of all of which there is nothing noted in the post-mortem record. Much more plausible, therefore, appears the explanation of an exacerbation of the old middle ear affection by the injury to the head, and later, the formation of the cerebral abscess under the influence of the progressive destruction of the petrous bone, on account of the integrity of the drum-head.

It need cause no surprise that the patient in the anamnesis did not report an older affection of the ear, as the otorrhœa, the most prominent symptom of most purulent middle ear inflammations, must have been lacking in our case; therefore, it would be possible that the patient was ignorant of his disease, if, at the same time, only a slight functional disturbance of the organ existed, which may easily be supposed where two of the ossicles were preserved, and particularly the stapes was easily movable in the fenestra ovalis.

In spite of careful search, the incus could not be found. Both during the crushing between the fingers of the semi-fluid masses filling the drum cavity, and in their microscopic examination, no bone particles could be demonstrated; therefore, a total destruction of this ossicle must be assumed.

III.—CHRONIC RIGHT-SIDED PURULENT OTITIS MEDIA; PARALYSIS OF THE FACIAL NERVE IN THE LAST WEEKS OF LIFE; DEATH UNDER CEREBRAL SYMPTOMS.

AUTOPSY.—*Right side, purulent otitis media with perforation of the membrana tympani; caries of the roof of the drum cavity and of the external auditory meatus; an inspissated exudation compressing the facial nerve in the Fallopian canal, which was open toward the drum cavity; purulent basilar meningitis; abscess in the right temporal lobe.*

Mrs. Meier, æt. 28, a laboring woman, was received into the surgical ward on March 30, 1879; she states that she had been

affected from infancy with a purulent discharge from the right ear, which had increased in the last weeks. At the same time violent headache occurred, for which the patient had taken large doses of morphine. Two weeks since, the mouth had been drawn toward the left.

Patient, not feverish on admission, complained of violent headache ; papillary granulations were proliferating from the right ear-canal ; hearing on right side completely abolished. After a three-days' treatment in hospital, the headache disappeared, and patient continued in a tolerable condition until April 12th, when violent diffuse headache with vomiting and retention of urine reappeared. While the two last-mentioned symptoms abated after a few days, the headache persisted in greatest intensity and localized itself in the right temporal region, for the relief of which patient received morphine twice a day. The scooping out of the granulations from the auditory meatus was ineffectual ; the attempt to chisel the mastoid process open was omitted, as the bone, on external examination, proved normal. This condition continued until April 30th ; then a slight fever set in, the complaints of headache grew less, and the patient remained in a somnolent state, from which, however, she could be easily aroused ; the pupils, which at first had shown nothing extraordinary, now grew wide, but otherwise reacted normally. The pulse offered nothing noteworthy. Patient died on May 5th, after gradually increasing coma.

Autopsy, *May 6th*, 24 hours after death.—Yellow, fetid pus in the right external auditory meatus. The left cerebral hemisphere slightly flattened in the region of the central convolutions. On removing the brain, the pia, with dura mater adherent over the middle of the upper edge of the right petrous pyramid, tears, and about a teaspoonful of tenacious yellow pus is emptied from the right temporal lobe. In the subarachnoidal space between medulla oblongata and vermis inferior there is likewise a copious accumulation of exudation ; the nerve trunks branching bilaterally from the medulla oblongata, especially on the right, and there the facial-acoustic more than the others, are embedded in a thick, purulent layer of exudation, after the removal of which the nerves appear intact. Arteries at the base of the brain empty. On pressure upon the brain substance surrounding the torn part in the right temporal lobe, a considerable quantity of pus exudes, and on section of this lobe we encounter a cavity, the size of a

small hen's egg, reaching anteriorly almost to the point of the temporal lobe, posteriorly to the occipital convolutions, internally to the gyrus hippocampi. It is filled with creamy, yellow pus; invested with a thin, slightly villous, consistent pseudo-membrane; outwardly divided by a wall, which is partially perforated in its anterior portion, from a second analogous cavity the size of a pigeon's egg. Each of the abscesses is separated from its surroundings by an almost parchment-like, tough, reddish-gray layer of brain substance fully 2 *mm.* thick. The lateral ventricles of normal width; in the right there is a turbid, light-yellowish serum; in the left, a fibrino-purulent exudation investing the choroidal plexus of that side; after its removal by a stream of water, the opacified, ecchymosed ependyma is exposed. The fourth ventricle empty, its ependyma swelled and likewise ecchymosed; cerebellum consistent, pale on section, free from diseased patches; the latter are also absent in the ganglia of the ventricles and base of the brain. Corresponding to the place of rupture in the pia investing the right temporal lobe, the dura, too, shows a defect the size of a lentil, from which the knob of the probe penetrates to the rough bone. After the removal of the dura, we recognize a slightly funnel-shaped loss of substance with smooth walls and a rough, yellowish-gray fundus, the size of a hempseed, which, however, does not lead into the drum cavity. The sinuses at the base of the skull are free from pathological alterations.

A portion of the base of the skull, removed according to Schalle's method, shows the mastoid process of the right side consisting throughout of solid bone-substance, of ivory hardness, which is especially conspicuous in comparison with the normal cellular composition of that on the left side. The tegmen tympani is discolored, grayish-green, translucent; after it is chiselled off, we encounter a roomy, irregular cavity filled with a lumpy, semi-fluid mass the size of an almond, which may be easily crushed between the fingers. The cavity communicates with the external ear-canal both directly, in consequence of the total absence of the membrana tympani, and by several fistulous openings in its upper wall. (Microscopically the above-mentioned mass shows the same component parts as that in Case II.) The walls of the auditory meatus are deprived of their membranous covering, rough, and covered partly with a thin layer of pus, partly with necrosed shreds of tissue. The spacious cavity mentioned is lined with a smooth, grayish-yellow coating resembling

mucous membrane, and is formed by a confluence of the drum cavity with the vestibule, the mastoid cells and antrum, and contains no trace of the ossicles. Cochlea, internal meatus, and the nerves terminating within it, are intact; the facial, in its course between the two bends of the Fallopian canal, also offers nothing noteworthy; below the second bend the wall toward the drum cavity is destroyed, and the nerve is separated from the plug of exudation filling the above-mentioned roomy cavity only by a thin mucoid membrane. The auditory organ of the left side is intact.

In the otherwise quite clear anatomical and clinical particulars of the case, and in reference to the epicritical remarks on Cases I and II, I would here emphasize, as especially interesting, the anatomical substratum of the paralysis of the facial nerve observed *intra vitam*, which, in the absence of a bony wall separating the facial nerve from the drum cavity, obviously consisted in a direct compression of this nerve by the plug of inspissated exudation filling that roomy cavity in the petrous bone. Occurrences of that nature render intelligible the well-established fact that paralysis, occurring in the train of purulent otitis media, may stop* as soon as the cause maintaining the paralysis ceases. Absorption of the masses of exudation compressing the nerve, is certainly not impossible. Green† reports a similar case (death ensued from meningitis; no cerebral abscess present), in which the Fallopian canal was likewise open toward the drum cavity, so that the facial nerve appeared covered directly with the swollen mucous membrane.

IV.—BILATERIAL OTORRHŒA AFTER SCARLATINA; FORMATION OF POLYPI IN THE LEFT EAR; CESSATION OF THE DISCHARGE AFTER REMOVAL OF THE POLYPI; OCCURRENCE OF HEADACHE AND RENEWED PURULENT OTORRHŒA EIGHT WEEKS BEFORE ADMISSION; SCRAPING OUT OF THE MASTOID PROCESS; PROLIFERATION OF CAULIFLOWER EXCRESCENCES IN THE DEPTH OF THE WOUND; DEATH UNDER MENINGITIC SYMPTOMS.

AUTOPSY.—*Epithelioma of the left drum cavity, with destruction*

* v. Trœltsch, Lehrbuch, pp. 413 *seq.*

† Cases of Fatal Otorrhœa; *Boston Med. and Surg. Jour.*, Nov. 30, 1871.

of the greater portion of the temporal bone; purulent basilar meningitis.

Mr. Stumpf, æt. 53, turner, was admitted December 14, 1878, to the surgical division of the General Hospital, stating to have had scarlatina when eight years old, and to have been hard of hearing ever since. Eight years ago, a polypus was removed from his left ear, since which time the existing otorrhœa had disappeared. Eight weeks ago, violent left-sided headache has set in, accompanied by a recurrence of the discharge. Six days ago, a physician of this city performed paracentesis of the mastoid process without removing the headache.

On admission, patient is not feverish; from the left auditory meatus a slight discharge of pus; hearing on the left side completely absent. Upon the left mastoid process there is a deep wound with retracted margins, discharging fetid pus. On December 27th the mastoid process was extensively chiselled open; the carious masses of bone present were removed with the sharp spoon, so that a large cavity was made which freely communicated with the external ear-canal. Lister's dressing.

The course of healing was normal throughout, at no time fever, the edges of the cicatrized wound drawn in, but the cavity remained of equal extent, discharging first a healthy-looking, later an excessively offensive, matter; in its depth, white, cauliflower-like masses could be seen proliferating, which more and more displaced the flesh-colored granulations present soon after the operation, and giving rise to the suspicion that we had to deal with a malignant neoplasm springing from the temporal bone. On March 11th no alteration had occurred in the wound, only the above-mentioned proliferations grew more abundant and the cavity at the same time deeper; a slight fever with violent headache set in, soon followed by somnolence, and death ensued on the evening of the 12th. In the last two days retention of urine existed.

Autopsy, *March 13th*, 18 hours after death. Moderately well-nourished male cadaver; behind the left ear there is a loss of substance, 3 *cm.* long, 2 *cm.* broad, bordered by smooth margins. It leads into an irregular cavity, bordered by ragged walls, extending toward the base of the skull, and directly communicating with the external auditory meatus. After dissecting off the integument of the skull, the squamous portion of the left temporal bone down to the zygomatic arch and the temporal border of

the parietal bone are found destroyed; the entire mastoid portion of the temporal bone is absent; the margins of the defect greenish; the soft coverings of the skull over the described defect are œdematous, covered on their inner surface with warty excrescences. Dura mater firmly adherent to the walls of the skull, detachable with difficulty, shining on its inner surface like a tendon; the pia of the convexity œdematous, opaque, easily detachable. At the base of the brain, almost exclusively confined to the left half of the pons and the anterior part of the medulla oblongata, there is an exudation penetrating the meshes of the soft cerebral meninges, consisting of creamy pus surrounding the nerve trunks branching from here, and from which the left facial-acoustic is difficult to separate; otherwise the nerve trunks mentioned are here unchanged. Cerebral surface dark-gray, covered with numerous points of blood which may be washed off; brain substance consistent, its cut surface moist; ependyma of the lateral ventricles, which contain small quantities of clear serum, smooth and reflecting. The ependyma at the floor of the fourth ventricle opaque, interspersed with punctiform hemorrhages. The entire brain is free from patches of disease. The dura investing the clivus of Blumenbach is covered with thin fibrinous pseudo-membranes. Sinuses at the base of the skull free from abnormal contents. The left Gasserian ganglion intact.

After removing the base of the cranium according to Schalle's method, the left petrous bone, excepting a remnant formed by the point of the pyramid, is found absent, and its place taken by a mass of club-shaped vegetations, in their entirety offering an exquisite cauliflower-like aspect; the mass extends in front as far as the posterior periphery of the internal auditory meatus, the anterior margin of which appears rough and ragged, so that the entire border of this opening has grown irregular, and the porus internus wider than on the healthy side. The nerve trunks terminating therein are totally destroyed and merged in the above-mentioned cauliflower-like masses in which isolated particles of bone may be demonstrated by the touch. In the discolored fundus of the internal auditory meatus, which is filled with sand-like bone detritus, the transverse ridge of the normal organ is wanting; the semicircular canals are also destroyed. Toward the normal remnant of the temporal pyramid the vegetations are limited by a narrow, grayish-white border. The chiselling open of the cochlea

was desisted from on account of the entire absence of any direction, owing to the described alteration of the internal ear-canal and in order to preserve the specimen.

The opposite joint-surfaces of the left condyloid process of the occiput and atlas are deprived of their cartilaginous covering, and, like the adjoining portion of the body of the atlas, are rough and colored a dirty green. Naso-pharyngeal space normal; the osseous part of the left Eustachian tube loses itself within the proliferations occupying the entire drum cavity. The parotid is intact.

The microscopic examination of portions of the vegetations, hardened in alcohol, showed, besides a sparse connective tissue stroma interspersed with young round-celled elements, numerous epithelial cones of varying length, with a large number of cells, partly in a state of horny metamorphosis, presenting an exquisite concentric arrangement,—in short, a picture corresponding to the well-known structure of epithelial carcinoma.

Although the clinical observation of the above-described case rendered the diagnosis of a malignant neoplasm of the petrous bone exceedingly probable, owing to the proliferation of those cauliflower-like masses arising from the bottom of the cavity after the operation, this supposition has been placed beyond a doubt by the autopsy and the microscopic examination of the vegetations described, and, accordingly, we had to deal with one of those rare cases which must be considered a *primary epithelial carcinoma of the petrous bone, especially the drum cavity.* It cannot be doubtful that the tympanic cavity is indeed to be looked upon as the starting-point of the new-formation, after the anatomical demonstration which proved the neighboring organs (auricle, cutis of the face, parotid) intact and thus excluded their primary affection; the less so, as the auditory meatus likewise, at the admission of the patient in December, was entirely free from any masses pointing to a new-formation, and only was destroyed after the scraping out of the mastoid process. Hence, the drum cavity is certainly demonstrated, by exclusion, to have been first affected by the new-formation, and the case is to be placed beside those communicated by Schwartze * and Lucae.† A case lately

* *Arch. f. Ohrenheilkunde.* Bd. ix, pp. 208 *seq.*

† *Arch. f. Ohrenheilkunde.* Bd. xiv, pp. 127–129.

described by Delstanche,* of primary epithelial carcinoma of the organ of hearing, has sprung, according to the author's opinion, from the external auditory meatus.

As to the etiology of the case in question, I am inclined to bring the long-standing otorrhœa into connection with the later development of the neoplasm, and in this respect I indorse the idea of Roosa thus expressed: "That the malignant growths may be also the result of the same original process" (viz., neglected suppuration).

The apparent rarity of epithelial carcinoma starting primarily from the auditory organ, and especially the middle ear, and the small number of communications† hitherto to be found in literature, are probably owing to the circumstance that the clinical course of such cases, especially in the incipient stage, is so similar to caries and necrosis of the petrous bone that no differential diagnosis can be made without a microscopic examination of the granulations; according to Lucae (comp. l. c.) even the microscope is not always able to furnish the decision.

Worthy of mention in our case is the disease of the occipito-atlantic joint corresponding to the affected temporal bone, which may be explained without difficulty through the anatomical neighborhood of the mastoid portion of the temporal bone to the occiput; clinically, it did not enter into the symptoms, but in analogous cases the possibility of such occurrences should be borne in mind, and the condition of this joint receive attention in post-mortem examinations.

V.—PEBBLE IN THE LEFT EXTERNAL EAR CANAL; ATTEMPTS AT EXTRACTION; DEATH FROM MENINGITIS.

AUTOPSY.—*Defect of the membrana tympani, a pebble wedged in the drum cavity pressing against its labyrinth wall; fissure in the head of the malleus; destruction of the joints between the ossicles; detachment of a piece from the wall of the labyrinth; purulent inflammation of the drum cavity; purulent convexity meningitis.*

* *Arch. f. Ohrenheilkunde.* Bd. xv, pp. 21 *seq.*

† Comp. Schwartze: "Pathol. Anatomie des Ohres," 1878, pp. 20 and 98; the same, *Arch. f. Ohrenheilkunde.* Bd. ix, pp. 216, 217.

A three-year-old girl had, during play, stuck a pebble into her left ear; futile attempts at extraction having first been made by a surgeon, continued later by a physician under chloroform, likewise without success, the little patient was brought to the hospital on the following day, already with threatening symptoms. Attempts at extraction were here continued without effecting the dislodgment of the foreign body. On the evening of the same day, although the meantime greatly-inflamed auditory meatus was at once bandaged antiseptically, the first symptoms of meningitis set in, which, despite continued antisepsis, progressed with most violent symptoms, leading to the death of the little patient on the seventh day after admission.

AUTOPSY, eight hours after death of the vigorous child, showed the following conditions of the cranial cavity: Dura firmly adherent to the longitudinally oval vault of the skull; fontanels closed; in the upper longitudinal sinus a loose lardaceous coagulum. Interior surface of the dura of normal tendinous lustre; the soft meninges of the convexity, especially on the left side, partly diffusely infiltrated with pus, partly showing only along the large venous, tightly-filled vessels purulent streaks of exudation, which may be followed along the arteries of the fossa of Sylvius into that cavity; the base of the brain, together with the nerves branching from there, free from any masses of exudation. Arteries of the base of the brain thin-walled, empty. After the easily-effected detachment of the meninges, investing the cerebral surface like a dense veil, metamorphosed in the manner described, the gyri appear flattened, broad, crowded together; cerebral surface reddish-gray; consistence of the brain doughy; on the cut surface some punctiform blood stains, readily washed off. Lateral ventricles with smooth ependyma, empty corpus callosum and anterior crura of the fornix of semi-fluid consistence. The entire brain free from diseased patches. The transverse and superior petrous sinuses filled to repletion with dark fluid blood; the meshes of the cavernous sinus œdematous. Dura of the base bright, hard to detach; the bones of the fundus uninjured.

At the base of the skull, removed after Schalle's method, we recognize, in the depth of the left auditory meatus, a grayish-yellow, flinty, foreign body, between the upper border of which and the bone a narrow fissue is visible. The walls of the meatus covered with ragged remnants of tissue and creamy pus. On chiselling off the roof of the tympanic cavity, the drum cavity

mastoid cells, and mastoid antrum appear filled with thin-fluid pus which is carefully washed off; thereupon ragged remnants of intensely reddened mucosa, oscillating in the stream of water, may be seen in the drum cavity; the walls of the tympanic cavity are in many places deprived of their covering, so that the bone is directly exposed. The ossicles displaced both toward one another and toward the adjoining bone; the manubrium mallei and the long crus of the incus crowded apart, so that the former is directed toward the mouth of the tube and the latter toward the wall of the labyrinth; between these two lies the above-mentioned foreign body, and presses firmly on the labyrinth wall of the drum cavity; a semilunar, hair-like fissure extends through the cartilaginous covering on the posterior periphery of the head of the malleus. The membrana tympani is totally destroyed; corresponding to the region of the annulus tympanicus, the walls of the auditory meatus are broken open; especially the upper edge is formed by a sharply projecting bone; the drum cavity is separated from the external meatus by the foreign body. The stapes, dislodged from the fenestra ovalis, lies between the foreign body and the wall of the labyrinth, its head directed toward the mouth of the tube; in the neighborhood of the fenestra ovalis, an irregularly quadrangular piece of bone is broken off. The vestibule is free from purulent contents; the cochlea was not opened in order to preserve the specimen; the nerves terminating in the internal ear-canal show no abnormities, barring a slightly rose-colored injection of their neurilemma. The foreign body is wedge-shaped and so imbedded in the drum cavity that its base looks upward, its sharp edge correspondingly downward, one surface directed toward the ear-canal, the other toward the labyrinth wall of the drum cavity. An accurate measurement of the pebble could not be made without causing a displacement invalidating the specimen.

After what has been said it cannot be doubtful that the fatal termination was due to the therapeutic attempts at removing the foreign body, whereby the stone was displaced into the drum cavity through the at the time certainly uninjured membrana tympani, and causing, further, an extensive injury to the tympanic mucosa with consecutive purulent inflammation in the middle ear and adjoining mastoid cells, and a dislocation and partial crushing of the ossicles and the wall of the labyrinth. Under these circum-

stances, there were several passages capable of conducting the inflammation into the interior of the skull; but to me it seems the most probable that it was brought about through the veins leaving the drum cavity by way of the petroso-squamous fissure, inasmuch as nothing abnormal was demonstrated in the internal auditory meatus, and also the vestibule was found free from purulent contents; but still it is surprising that in the present case the base of the brain remained absolutely unaffected by the purulent inflammation of the meninges.

Regarding the literature of foreign bodies in the ear I refer to the text-books on otology by von Trœltsch and Gruber, and especially to Schalle's report on the otological division in the hospital-barracks at Dresden, in which the last-named author discusses a case, reported by Levi, of extraction of a foreign body in the ear, with fatal result from meningitis. I desire to employ the case under consideration as a warning: *not to impart a greater importance to foreign bodies in the ear than they deserve, and "in their extraction to proceed with the utmost care, and in some cases to entirely desist from it,"* for it is well known "that a body which got into an opening generally can also get out again. With an appropriate position of the head this happens the soonest spontaneously."* Should, however, threatening symptoms of any kind be induced by the presence of the foreign body in the auditory canal, rendering its removal by instruments necessary, the eye must guide them, as in that way alone injuries can be avoided. It is not within the scope of these lines to enter fully into the methods of extraction to be considered in analogous cases; this one remark only, formulated in the sense of my esteemed superior, Dr. Martin,† may here find room—that, if we succeed in passing an instrument behind the foreign body, it must remain in the auditory canal in order to prevent the foreign body from entering more deeply into the meatus during attempts at extraction with a second instrument.

* Von Trœltsch, "Lehrbuch," p. 473.

† To whom I beg to tender my warmest thanks for his liberality in placing the entire material at my disposal.

OTITIS MEDIA PURULENTA, WITH NECROSIS OF THE INNER WALL OF THE TYMPANUM, AND OF THE MASTOID PROCESS.

By Dr. J. MICHAEL, of Hamburg.

Translated by James A. Spalding, M.D., Portland, Maine.

(*With two wood-cuts.*)

A child, æt. 3, with a healthy father and phthisical mother, came under my charge February 15, 1877, after having suffered for two years with deafness, otorrhœa, and complete facial paralysis on the left side. A fluctuating, but not very sensitive swelling, as large as a pigeon's egg, has formed on the left mastoid process within a few weeks. The child looks cachectic, but has no subjective annoyances. The ear proved on examination to be full of yellow and offensive pus, and a red mass was discovered, from which a whitish spot projected. On using the probe it proved to be a piece of bone, but was not very movable. Right ear, *Mt* and hearing normal.

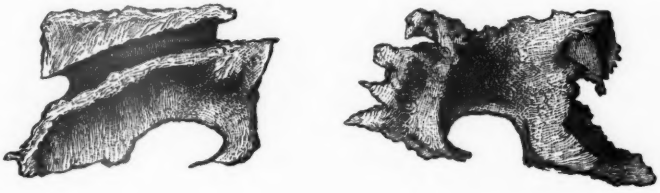
The swelling was opened by a broad incision; about two tablespoonfuls of healthy pus escaped, and the cavity, whose walls were stiff and thickened, was filled with cotton saturated with carbolic oil. It soon filled up with granulations, and in two weeks was healed. A renewed examination of the ear now showed that the sequestrum was more movable than before, but its form and size could not be precisely determined. It seemed to be inserted backward and upward. As the child was otherwise quite well, and the condition of the parts rather uncertain, I decided not to remove the sequestrum by force, as it might prove dangerous, and merely ordered syringing with a disinfectant solution (five per cent.) of carbolic acid.

At subsequent examinations during intervals of several weeks, I found that the mobility of the bone became more and more marked.

July 20, 1878.—The piece of bone described below was brought to me, with the statement that it had fallen out a few days before during the syringing. An examination showed still more porous bone in the meatus, and four pieces were easily removed by syringing and the forceps. A granulated surface then came into view, and no more bone could be discovered with the probe.

Fourteen days later the otorrhœa had wholly disappeared, and a funnel-shaped depression, covered with an epidermoid lining, occupied the position of the tympanum. The facial paralysis continued unaltered, but the general appearance had improved decidedly.

Description of the specimens.—Four pieces of bone, the largest



of which is 1 *cm.* long and 0.75 *cm.* broad, consist of cellular bony tissue, which, from their nature, must belong to the mastoid process. The cells were so much permeated with dry pus, that the bones at first appeared to be solid, and their real constitution was discovered only after maceration in water and preparation with needles.

A fifth piece, 0.75 *cm.* long and 0.50 *cm.* wide, has one smooth concave surface, with some spongy substance adherent. This seems to be a part of the posterior wall of the tympanum, to which a portion of the mastoid process is attached.

Finally, the piece first removed (see figures) is 0.60 *cm.* high, 0.80 *cm.* wide. It is the upper part of the inner wall of the tympanum, and contains the greater portion of the foramen ovale, and the overlying portion of the facial canal, which, on the other side is not completely closed, but forms only three-quarters of a cylinder.

Only a few cases of spontaneous exfoliation of important portions of the organ of hearing have as yet been published. In most cases the cochlea alone formed the sequestrum, as in Nos. 3 and 4 of the cases published by Toynbee,* in Gruber's case † both cochleæ were exfoliated after scarlatina in a boy seven years old. Parreidt,‡ Patterson-Cassels, § Ménière,‖ Lucæ,¶ and Dennert ** have also reported cases. The whole labyrinth, with a part of the inner wall of the tympanum was extracted by Crampton,†† and the larger portion of the petrous bone by Toynbee.‡‡ In our specimen the beginning of the facial canal could be seen in the bottom of the internal auditory meatus; both windows and the promontory from in front, and the vestibule was visible through the windows. Gruber §§ removed a part of the mastoid process and squamous portion, and Boeck ‖‖ a necrosed piece of the external auditory meatus. Jacobi ¶¶ extracted a sequestrum described by Voltolini as containing the porous acusticus internus, the labyrinth and vestibule, and a part of the inner wall of the tympanum containing the round window and adjacent portions. Finally, in four cases,*** the autopsy revealed large portions of the organ of hearing lying as sequestra in the petrous bone.

My preparation differs from all previously reported by the presence of the tympanic portion of the facial canal (never before described), as well as by the confirmation of the presence of a sequestrum long before its exfoliation.

The prognosis of these cases is much more favorable than

* *Arch. f. Ohrenhlkde.*, Bd. i, pp. 112, 158.

† Schwartze, *Arch. f. Ohrenhlkde.*, Bd. ix, pp. 238 *et seq.*

‡ *Ibid.*

§ *Ibid.*

‖ *Gaz. Méd. de Paris*, 1859, page 50.

¶ *Arch. f. Ohrenhlkde.*, Bd. x, p. 236.

** *Arch. f. Ohrenhlkde.*, Bd. x, p. 231.

†† *Arch. f. Ohrenhldke.*, Bd. i, pp. 112, 158, as cited by Toynbee.

‡‡ *Ibid.*

§§ *Wiener Medicinalhalle*, 1863.

‖‖ Schwartze, *loc. cit.*

¶¶ Voltolini, *Monats. f. Ohrenhlkde.*, 1870, p. 84.

*** Toynbee, *loc. cit.*, cases 5 and 6; Schwartze, *loc. cit.*, case 3; v. Trœltsch; Virchow's *Arch.*, Bd. xvii, p. 47.

one would expect from so violent a disease of the bone so near the brain. None of the cases in which the sequestrum was removed during life, were fatal and in most of them the disease was stopped by the exfoliation.

Absolute deafness results as a matter of course after removal of the cochlea, and observations in a different sense must be regarded as errors. My patient was too young to yield any useful results by testing his hearing.

Incurable facial paralysis is also very frequent, but in a few cases its absence has been expressly mentioned.

In all cases the treatment consisted in the removal of the loosened bone by extraction or by syringing.

CHRONIC PURULENT INFLAMMATION OF THE MIDDLE EAR AND ABSCESS OF THE BRAIN EXISTING INDEPENDENTLY OF EACH OTHER.

By Dr. J. MICHAEL, of Hamburg.

Translated by James A. Spalding, M.D., Portland, Maine.

Johann Barmhausen, a carpenter, æt, 31, was always well until nine years ago, when he received a violent blow from a board on the left side of the head. He fell to the ground and remained insensible for five hours. He recovered gradually, and felt so well in a few days that he went to work again. His mind was perfectly clear, he had no disturbances of motion, and the only permanent symptom after the accident was an occasional ache in the left side of the head, which he referred to megrim. He has had a discharge from both ears and been moderately deaf for the last two years.

November 10, 1877, I was called to see the patient, who had been suffering for a few days from very violent headaches, which had begun on the left side and gradually passed over the whole head. He complains of a feeling of pressure in the centre of his head. He says that he feels stupid, and cannot recollect several words. With this exception his mind is clear, and the missing words (nouns exclusively) are avoided very skilfully by circumlocution.

The patient lies in bed with his head drawn somewhat downward into his neck, and its motions, both active and passive, are interfered with. His face is extremely red, his eyes are glittering, the pupils different and reacting sluggishly, the organs of the chest normal, belly sunken, tongue coated, appetite poor, and he has been constipated for several days. Pulse 100 ; temperature 37.4°.

The urine is free from albumen. Neither the auricles nor mastoid processes are especially sensitive to pressure.

Both ears contain a moderate amount of purulent secretion. Both *Mtt* show large perforations, which are filled with polypoid growths springing from the tympanum.

This condition did not alter much in the next four days, except that the patient felt somewhat relieved for a few hours after removal of some of the polypi by Wilde's snare (probably from the subsequent loss of blood, which was purposely encouraged for some time by lukewarm instillations).

The treatment also consisted in large doses of calomel, leeches to the neck and left ear, and ice-bags.

I diagnosticated: *Cerebral meningitis, due to rupture of an abscess in the left side of the brain, originating in the injury.*

The continuous pain in the left side after the accident seemed to indicate the presence of an abscess, which sometimes reveals itself by this symptom alone. This probability was increased by the symptoms observed in the last few days, which pointed to a severe cerebral affection. This could hardly be regarded as an acute purulent meningitis, because two important symptoms, feverishness and slowness of pulse, were absent. The temperature had never risen above 37.4°, the pulse never fallen below 100. But still the pain in the neck, the redness of the face, the glittering eyes (symptomatic of meningitis, J. P. Frank), and all the more surprising in the entire absence of fever, the sluggishness of the pupils, and the sunken belly, led me to diagnosticate a meningitis, especially when I recalled Traube's rule, to make our diagnosis from the symptoms present, not from those that are absent.

As the meningitis appeared so suddenly, we had to regard it as due to the rupture of an abscess, for tubercular meningitis develops more slowly, and was here excluded by the absence of any affection of the lungs, and epidemic cerebro-spinal meningitis was not then prevalent.

We could conclude that the supposed abscess was not, as is usual, dependent on the affection of the ear, because the pain in the left side, although more intense in later years, had been present ever since the injury; secondly, because

the pain starting from the ear confines itself chiefly to the temporal lobes and does not cause aphasia; and, finally, because, as I have often noticed, spontaneous pain referred to the organ of hearing, and sensitiveness of the tragus and mastoid process to pressure, usually precede the affection of the meninges from the ear, while in this case they were entirely absent.

From this diagnostic stand-point, the case must naturally be regarded as entirely hopeless.

The further course was as follows: After this state had continued unaltered, in spite of all the treatment employed, a tonic spasm with loss of consciousness ensued at noon on November 16th, and lasted for an hour, accompanied with stiff flexion of the four extremities. Delirious speech, deep stupor, excessive sensitiveness of the skin, and violent pain at every movement of the back, appeared with the return of consciousness, so that whenever he was moved, especially when we tried to raise him, he would shriek aloud, and lie quite motionless with stiffened back and outstretched extremities.

This sudden change indicated that the meningitis hitherto cerebral, had become cerebro-spinal by a new rupture.

The delirium and sleeplessness continued in spite of morphia injections, which only caused half an hour's rest. STOKES respiration came on at evening (pulse 130, temp. 37.4°), and the patient died on the following morning after violent agony.

The AUTOPSY made on the same day by Dr. DEHN confirmed my views. The only changes in the trunk were a few thread-like adhesions of the pleura costalis to the lungs, and slight icteric coloring of the acini of the liver. In the head a dirty yellow spot as large as half a dollar projected about 2 *mm.* above the surface of the dura mater on the left side, just over the crista superior of the petrous bone (corresponding to the site of the injury). The dura elsewhere was easily removed, and the pia mater at its convexity covered abundantly with a purulent secretion, especially in the meshes corresponding to the course of the excessively congested vessels. On removing the dura mater, which was adherent to the pia mater at the spot mentioned before, the pia mater was torn away, and a large abscess cavity opened, from which a discolored, stringy, purulent fluid exuded.

After removing the brain, the ventricle was opened and found

filled with the same opaque fluid, very much distended, the ependyma discolored, especially over the corpus striatum, and an opening outward from the corpus striatum communicated with the abscess, and was surrounded by softened and ragged brain-substance. This irregular cavity occupied a large portion of the temporal lobe, a part of the posterior lobe, and was lined with a thick, dark-gray layer of pigment. The brain-substance of the anterior portion of the temporal lobe, and the frontal lobe was œdematous and softened ; the plexus choroidei adherent by means of firm agglutination. The right lateral ventricle as well as the third and fourth was also filled with the fluid mentioned before. The meshes of the pia at the base, corresponding to the middle brain and the medulla oblongata, were filled with yellow pus, and this same infiltration extended to the vertebral canal, so that sections of the spinal cord were found surrounded by pus.

All the sinuses were intact, and the bones of the base normal, with the exception of a pale, greenish patch over the left tegmen tympani. The dura mater could be easily removed from this spot, and was normal, as was also the pia. Both tympana were lined with a polypoid mucous membrane, and the mastoid cells filled with thickened pus. Both temporal bones were healthy. The diagnosis from the autopsy was : *Encephalitis lobi temporalis et occipitalis sinistri. Oedema lobi frontalis sinistri. Pachymeningitis chronica circumscripta. Leptomeningitis cerebralis et spinalis acuta. Otitis media chronica pura bilateralis.*

I regard this case as one of more than usual interest, on account of the peculiar coincidence of an affection of the ear, with an entirely independent abscess of the brain. If the abscess had burst a few days later, it would hardly have been possible differentially to determine its origin at the autopsy, since the meninges over the greenish and discolored tegmen tympani on the left side, would by that time have undergone pathological alterations. And besides this, the course of a cerebro-spinal meningitis, absolutely without feverishness (two thermometers were constantly employed), is one of extreme rarity.

ON MÉNIÈRE'S DISEASE.*

By Dr. A. GUYE, of Amsterdam.

Translated by James A. Spalding, M.D., Portland, Maine.

CONCLUSIONS.

1. Ménière's disease or the symptoms of Ménière's disease, include in the most general use of the term all those cases in which a sensation of vertigo is caused by abnormal irritation of the nervous terminal apparatus in of the semicircular canals.

2. In a narrower sense, we must include under Ménière's disease those cases of inflammatory processes in the semicircular canals themselves or in the middle ear, producing vertigo, which is either continuous or caused by normal movements of the head, or appearing only paroxysmally after intervals of weeks or months.

3. Most if not all the cases of Ménière's disease are of a secondary nature, *i.e.*, they are due to inflammatory processes in the tympanum or antrum mastoideum.

4. In typical cases the vertigo is preceded or accompanied by sensations of rotation in regular progressive steps ; first, we have a sensation of rotation about a vertical axis, and constantly *toward the affected side*, oftentimes to and fro, but never simply toward the healthy side ; this is followed by a sensation of rotation about a transverse axis forward and backward ; the vertigo then generally becomes complete, and the patient swoons, with or without loss of consciousness and vomiting. The attack in some cases usually passes off in from two to thirty minutes ; in others the sensitiveness to every movement lasts one or two days, during which the patient must rest in bed.

* Read before the Otological Section of the International Medical Congress, at Amsterdam, Sept. 9, 1879.

5. Sensations of rotation are sometimes produced by external therapeutic applications to a diseased ear, such as forcing air into the tympanum in some cases of acute inflammation of the tympanum, syringing water into the antrum mastoideum after perforation of the mastoid process, when the water escapes either through the external auditory meatus or the Eustachian tube. In such cases the sensation of rotation is constant, around the vertical axis and *toward the affected side.*

6. The seizures are often accompanied by intense subjective sensations of hearing, which in many cases continue permanently in a moderate degree, and without exacerbations during the seizures; in rarer cases subjective sensations of hearing are wholly absent.

7. In long-standing cases, a slight feeling of vertigo persists even between the attacks, and is noticed especially on first moving the head after awakening from sleep. Or there may be a feeling as if one were falling forward or backward, or a forced and stiff position of the head, because every movement in the plane corresponding to a given semicircular canal makes one feel as if a piece of lead were moving simultaneously in the same direction. In one very pronounced case of my own, the head was held forward and to the left, corresponding precisely to the plane of the left sagittal canal. The left ear was the one affected.

8. Conditions simulating chorea in children, and clonic contractions of the muscles of the face and upper extremities in adults, to say nothing of frequent complications with hysteria, may develop themselves in the course of the disease, and disappear wholly after local treatment of the affection of the ear.

9. The affection can be relieved with or without loss of hearing.

10. Local treatment is most successful in cases that are not too old, and often, indeed, in the most hopeless cases.

11. Amongst internal remedies, quinia, as recommended by Charcot, deserves most reliance, in so far as it often lengthens the interval of freedom from attacks during the course of its exhibition. Quinia, moreover, often acts paradoxically in chronic affections of the ear, by wholly removing the previous tinnitus, while increasing the deafness temporarily during the course of its exhibition.

GENTLEMEN: I propose to communicate to you the re-

sults of the investigations upon Ménière's disease, which I I have been much interested in making for several years, and to hear whether they agree with your own.

There are three sorts of communications which I have to lay before you: first *ætiological*, second *physiological*, and third *therapeutical*.

ÆTIOLOGY.

First of all, I lay much stress upon cold and catarrh of the middle ear. Aurists, for a long time, have feared the effects of cold upon their patients, and only unwillingly allowed them to indulge in surf-bathing. In my opinion, persons suffering from affections of the ear should not be allowed to expose their ears to cold winds, without the strictest precautionary rules. I have seen cases where deafness was either started, or considerably increased, by remaining long in the surf, or vertigo caused by syringing cold water in the meatus, as a remedy for ringing in the ears. Cases of deafness with roaring and symptoms of vertigo are occasionally observed, which could be ascribed to pouring water over the neck and back of the head. I have seen people with slight growth of hair, in whom the wearing of a wig was followed by decided improvement of hearing. And what is more natural than that an organ which, in its normal condition, is so little exposed to variations of temperature, should endure such exposure badly, and undergo a loss of its functions!

Catarrh of the middle ear is met with in a majority of cases. We also see cases in which a catarrh of the tympanum and tubes is due to impermeability of the nostril, that has lasted for several years, and finally developed an affection of the middle ear.

Fissures of the skull must also be mentioned as causing Ménière's disease during their cicatrization.

SYMPTOMS.

The picture of an attack depicted in my *4th Conclusion*, does not differ essentially from the classical picture as given by Charcot, excepting in one point, which I regard as

of physiological importance. Charcot is quite right in designating the sensations of rotation about the various axes of the semicircular canals, as essential for Ménière's vertigo. These sensations of rotation are most frequent about a vertical axis, but neither Charcot nor any other author has been struck by the fact that they always correspond at first to a rotation *in the direction of the ear affected.* Patients usually define their sensation of rotation, as to and fro, but it is often too indefinite to afford us any real information. After repeated questioning, however, they are often able to recall their sensation, and, in a majority of cases, the sensation is in the direction above mentioned, and never in the opposite direction.

I will here note the first case in which my attention was drawn to this peculiarity.

CASE 1.—Miss B., æt. 16, while convalescing from typhoid fever in November, 1874, was attacked with a violent inflammation of the left middle and inner ear. The *Mt* was perforated, the mucous membrane of the tympanum covered with polypoid granulations, the Eustachian tube swollen; pain, roaring and vertigo were also present. She was forced to lie down, not being able to stand or walk except with difficulty. When I resorted to Politzer's method, she turned her head with terrible force toward the right side. As this phenomenon repeated itself daily, she always pressed her left ear firmly against the pillow before inflation. The moment the air passed through the tympanum, her head rotated 180°, so that her right cheek now lay on the pillow. In answer to my question, she replied that she felt a sensation of rotation in the opposite direction. The real rotation was perfectly unconscious, and produced by reflex action from the violent sensation. The patient lay for some weeks in a dangerous condition; in the following July she was completely restored, her hearing was normal, and the tympanum healthy. There has been no relapse.

I have since questioned all patients who complained of vertigo, in regard to their sensation of rotation and its direction. Their answers have often been doubtful, but whenever the rotations have been noted, it has always been in unison with the first observation.

In the following case I could produce the sensations of rotation at pleasure.

Case 2.—Mr. H., æt. 49, came under my care June 7, 1875. He had been affected with a chronic nasal catarrh, and been obliged to sleep for years with open mouth. Four months before, he had epistaxis which only ceased after plugging the nostrils with Belloc's sound. Deafness and roaring in both ears ensued in the early days after this operation. The right ear healed spontaneously, while a perforation and otorrhœa developed themselves in the left ear. The patient took no care of himself, and when he came to me the left external auditory meatus, and mastoid process were swollen and sensitive ; he suffered from roaring and vertigo, the latter being produced by every movement of his head. Six days later I made an incision over the mastoid process, and two days afterward opened the antrum mastoideum, and treated him subsequently in the usual manner with syringing, drainage tubes, etc. The interesting point in the case was that when water was syringed into the artificial opening, and escaped either from the external auditory meatus, or ran into the throat through the tube, the patient felt a very distinct and violent sensation of rotation about a vertical axis toward the left (affected) ear. He then said, "the chair has now made two or three turns." The sensation, was, however, not so overpowering as to produce a reflex rotation in the opposite direction, as in the previous case. This case also troubled me much, but was finally cured. In December both objective and subjective symptoms had disappeared ; the only trace left by the attack was a slight deafness in the left ear. This favorable result has lasted a whole year.

I will now turn for a moment to the significance of the sensations of rotation, with reference to the theory of the functions of the semicircular canals.

Our knowledge of the function of these canals rests, as is well known, upon the investigations of Flourens, presented to the Academy of Science, in Paris, in 1824, and published in the second edition (1842) of his "*Recherches expérimentales sur les Propriétés et les Fonctions du Système Nerveux.*"

Flourens regarded the semicircular canals as part of the auditory apparatus. His vivisections, which were partially

repeated at a later date by Goltz and Löwenberg, first revealed the involuntary symptoms of rotation, which are caused by section or irritation of these canals.

The opinion now generally accepted, which attributes to the canals the sensation of movements of the head, was only developed at a much later period by Mach,* Breuer, Crum Brown,† and others. This theory was also developed from a physical standpoint in a most masterly manner by Mach. Let us consider the horizontal semicircular canal. When the head is rotated about a vertical axis, the fluid contents of the horizontal canals will move in an opposite direction, or the pressure in one end of the canal will be increased. Now the ampullæ are provided with terminal nerves, and if we ascribe to them the sensibility of perceiving slight variations in pressure, the sensation of rotation is sufficiently explained from a physical stand-point. The theory demands from this stand-point that when a rotary movement has lasted long enough to impart movement to the fluid contents of the canal, the sensation of movement should cease. Mach's various experiments have furnished results which ascertain and confirm this theory. Still, as Crum Brown truly remarks, each canal has but *one* ampulla, and as the same organ of sense can only produce sensations differing in quantity, but not in quality, it is probable that one canal will respond only to the sensation of rotation around *one* axis and in *one* direction, because the sensation of rotation in an opposite direction is qualitatively different. Hence, Crum Brown concludes that the semicircular canals are paired organs, and that each canal corresponds only to the sensation of rotation in *a single direction.*

Mach has assented to Brown's hypothesis, and basing his views upon the investigations of Flourens, he concluded additionally that irritation of the ampulla of the *left* horizontal semicircular canal probably produces the sensation of *rotation about the vertical axis toward the right.*

If this view is correct, then the result to which my ob-

* Grundlinien der Lehre von den Bewegungsempfindungen. Leipsic, 1875.

† On the sense of rotation. *Journal of Anatomy and Physiology*, vol. viii.

servations have led me is incorrect. But it is an error, one which, however, need not diminish the value of Mach's labor, but to which I feel compelled to draw your attention. The proof of Mach's error is this: His experiments have always been made upon healthy people with perfect ears, and cannot prove that any sensation of rotation whatever originates in the one ear and not in the other. The persons on whom he experimented sat in a chair provided with a paper hood. The chair was set into motion at pleasure, and the person requested to state the manner and direction of the motion according to his sensations; the sensation was then ascribed to the semicircular canals. It is plain that these sensations could not be located in the one or the other ear by the persons concerned.

Mach's reason for ascribing the sensation of rotation toward the right side to the left semicircular canal, and not *vice versa*, lies in Flourens' experiments, and Flourens places him in the wrong. If we examine an account of Flourens' vivisections, we see at once that he lays no stress on this point. In his first communication in 1824 (*second edition*, *page* 445), he says: "The most singular point which we observe on cutting or pinching these organs, is a horizontal movement of the head, so brusque and violent that it is impossible to get any idea of it without having seen it."

In his second communication in 1828, he says, in describing the first experiment: "I cut the left horizontal canal in a pigeon, when a slight motion of the head from right to left and from left to right suddenly appeared. This motion lasted a short time," etc. If Flourens had written from left to right and from right to left, he would have agreed with me. He does not seem to coincide with me at this point, but as he lays stress only on the to and fro movements, it is possible that he made a mistake in observing the direction of the first motion. As all the rest of his experiments on this point agree with mine, it is evident that he made a mistake in his first experiment. I will only cite the following remark regarding his later experiments: "I began an experiment on a rabbit about

two months old, by laying bare both horizontal canals; I then cut the left horizontal canal. The animal's head began suddenly to move from left to right, and from right to left," etc.

Flourens, therefore, in his first experiment fell into an error which has given rise to a theory after 50 years.

While considering this point, I have looked over Lœwenberg's experiments (ARCHIVES, vol. iii., part 2, page 26), and found my observations confirmed in his first and sixth experiments. We can, therefore, regard it as a fact that the sensation of rotation on the left horizontal semicircular canal, is a sensation of rotation to the left, and in the right horizontal semicircular canal, to the right.

I will not now enter further into the physiology of the semicircular canals. I pass over the opposition of Prof. Böttcher and others to the theory of these canals as organs of sensation of motion. Böttcher, as is well known, ascribes the rotary motions after opening the semicircular canals, to secondary wounding of the brain. In order to criticize his experiments, one must repeat them. I will also pass over the symptom of vomiting, which is otherwise very weighty, and the subjective sensations of hearing, because I have nothing new to say concerning them. But I will add a brief account of two cases, which are somewhat interesting. The first, in relation to the ætiological action of cold; the second, in relation to the extent which the disturbances of a general nervous nature assume in Ménière's disease, and often render a diagnosis difficult.

CASE 3.—D. v. D., a blacksmith, æt. 45, consulted me December 16, 1878; he had suffered from typhus fever two years before, and has since remained deaf in his left ear. Three months ago, while at work, he was seized with vertigo, with distinct sensations of rotation, and fell to the floor. He resumed his work on the next day, but since then, at intervals of a week or ten days, he has had similar attacks, beginning with violent subjective sensations of hearing and sensations of rotation, which are always *to the left.* During these seizures he usually falls upon his anvil without losing consciousness; vomits; is then carried home, passes a day in bed, and goes to work again on the next day. When I asked him if he were

often exposed to cold, he replied that it was hot in his shop, and that the only ventilation came from a small window at his left side and somewhat higher than his head. He receives from this window an almost constant cold draught of air upon his left ear. The *Mt* contains a semilunar calcification; chronic catarrh of the tympanum is also present, probably remaining after the fever and appearing with exacerbations; he also suffers from a secondary labyrinthine affection, produced, as I believe, by the action of cold. A decided improvement ensued after local treatment. I ordered him to take precaution against cold, and succeeded, in February, in gaining intervals of seven weeks between the seizures. The patient considered himself well, but had a relapse, and as he cannot be placed under good hygienic circumstances, his condition still leaves much to be desired.

This case offers three points of interest:

1. The distinct sensations of rotation toward the ear affected.

2. The pronounced noxious influence of cold upon a partially diseased ear.

3. This is one of those frequent cases of Ménierè's disease in which the patient is far from ascribing to his diseased ear the nervous affection which makes life almost unendurable. These cases are the best proof of the importance of the study of otology for the general practitioner.

The following case may serve as supplementary to the one just reported:

Case 4.—Mr. C., æt. 37, a lawyer from Curaçoa, visited Amsterdam early in 1873 to seek advice for a nervous affection from which he had suffered for a year. He placed himself under the care of a general practitioner, who, on account of the urgency of the case, called in consultation a specialist in nervous diseases. This gentleman thought it possible that an aural affection might have caused the disease, and sent Mr. C. to me. The history is as follows: In September, 1877, Curaçoa was visited by a hurricane, which caused a terrible inundation. Mr. C. ran about bare-footed and bare-headed all day long searching for his wife and children. A short time afterward he suffered from toothache and pain in his ear; did not wholly re-

cover from them, and a year later was seized with attacks of vertigo, sensations of rotation and nausea, but without vomiting. He would usually keep to his bed for a day or two and then resume his professional work. At a later period he had to keep to his bed for weeks; had two seizures of vertigo daily, accompanied occasionally with convulsions, which have become habitual and lasted for several weeks, with violent and continuous pain in the back. His mental functions were unaffected. The roaring in his ears was formerly loud, but, although still persistent, it is weak in his left ear. Mr. C. gave me this general outline of his case at his first visit, April 5, 1879. It cost him, however, much exertion, for the continuous quivering of all his facial muscles made it very difficult for him to speak.

The case seemed as doubtful to me as it did to the patient when I began an examination of his ears. I found the following conditions: Hearing, right ear, watch 20 *cm*; *Mtt* not noticeably changed. Valsalva was unsuccessful, and Politzer was successful only on the right side. Catheterization succeeded on both sides, but it was rendered very difficult by the quivering of the muscles of the head and face. The patient also had chronic pharyngeal catarrh, and salt-water syringed into one nostril escapes but sparingly from the other. On examining the naso-pharyngeal space with my finger, I found the mucous membrane swollen and covered with extensive adenoid growths, which, when torn with my finger-nail, bled rather profusely. The patient sleeps with his mouth open, and on awakening, his mouth and throat are very dry.

I prescribed gargles, cleansing of the nostrils with solutions of salt and sal-ammoniac, catheterization every other day, weekly scraping of the adenoid growths, and also advised the patient to breathe through his nose with help of my anti-respirator. I did not suggest any constitutional treatment.

April 12th, a consultation was held with the general practitioners. The patient's condition had improved exceedingly; he could hold his head so steadily that the catheter could be easily introduced; the roaring had disappeared. H watch, *R*, 50 *cm*; L, 40 *cm*. Breathing through the nose was much facilitated, the mouth was kept closed all night, and was no longer dry on awakening. The pain in his back continued, a few of the vertebræ were sensitive to pressure, and the patient was still sleepless. We therefore prescribed sodii brom. 1–2 grams. daily, and the back

was painted with iodine collodium. The local treatment was continued for several weeks with constantly increasing success. The patient was quite well by June 2d. H watch, both ears, *2m.* August 17th, the patient visited me once more. The disease had entirely disappeared. The handwriting of Mr. C. during his illness gives some idea, although a weak one, of the trouble which he had in overcoming the spastic quivering of his muscles. August 21st, Mr. C. was kind enough to copy a portion of a letter, by which we can compare his morbid with his normal handwriting. (Compare photo-lithographic plate of the patient's handwriting during the disease and after its cure.)

Gentlemen: This case would have interested you much more could you have seen the patient during the course of his disease, or read the letter which he had brought from his physician in Curaçoa. You would then have felt the impression which he could not fail to make upon every physician whom he might have consulted—an impression of a general nervous disease, dependent upon the cerebro-spinal centres, or a "*sclérose en plaques*," or some other degeneration of the nerve tissue. The only point against such a diagnosis was the preservation of the mental functions, and this it was which particularly led the specialist on nervous diseases to question the patient about the present and past condition of his ears, and then to ask me to examine him more closely in this respect.

This case does not stand alone, but forms a link in a series of cases in which we see symptoms resembling chorea in young people, which originate undoubtedly in an affection of the inner or middle ear, and disappear without leaving any trace when the disease is cured.

21 January 1879

Geachte confrère,

Ofschoon mij niet geheel hersteld van mijne zware ziekte, die mij gedurende een geruime tijd belegerig heeft, doe ik mijn, trachten aan Uw desiderium van D. 18 Dec. en D. 6 beantwoorden.

Ik zal dezen heer dan eerige der door U verlangde stukken te bekomen, maar mag ik U opmerkzaam dat de opgaven van de afgelopen tien gedurende niet gerekend worden, en dat de heer Rechtsmeester reeds een plaatsvervanger van zijn ambt heeft.

21 January 1849.

Geachte Confrère,

Ofschoon nog niet geheel hersteld van eene zware ziekte, die my gedurende een gedeelte tijd bedlegerig heeft doen zijn, tracht ik U te schrijven van den 9den Decbr. a.p. te beantwoorden.

Ik zal myn best doen eenige der door U verlangde stukken te bekomen, maar maak U opmerkzaam dat de rapporten van de afdeelingen hier gewoonlijk niet gedrukt worden, en dat de pers Zich tegenwoordig niet (met) plaatselijke aangelegenheden bezighoudt.

Geschreven den 18den Augustus 1849. —

AURAL COMPLAINTS IN CONSEQUENCE OF MALARIA.

By F. C. HOTZ, M.D., Chicago.

As far as I know, Dr. Weber-Liel was the first who, in 1871, described a malarial form of acute inflammation of the middle ear, which he called *otitis intermittens.** Several years later, Prof. Voltolini † published some similar observations. But while Weber-Liel regarded the affection a real inflammation, Voltolini laid greater stress upon the neuralgic symptoms and called it *otalgia intermittens.* According to Weber-Liel the affection usually presented itself with all the objective symptoms of acute catarrhal otitis, and with a fulness in the head, noises in the ear, and pain in both. The peculiarity of the disease consisted in its intermittent character. Regularly at the same hour the pain would begin, increase in intensity for a certain length of time, and subside after a certain period; and like the pain, so all other symptoms, subjective and objective, would show free intermissions at first, and marked remissions during the later period of the disease. In some cases the pain was ushered in by a slight chill, and terminated with profuse perspiration. On the third or fourth day the membrana tympani was perforated, and a discharge from the ear set in without relief to the patient. The ordinary treatment for catarrhal otitis proved of no avail, the disease lasting many weeks and months, and ultimately even affecting the mastoid

* *Monatsschr. f. Ohrenheilkde.*, Nov., 1871.

† *Monatsschr. f. Ohrenheilkde.*, May to July, 1878.

cells. The use of quinine, however, arrested it at once and achieved a speedy cure. Concerning its frequency, Dr. Weber-Liel made this statement:* "Since I first described the *otitis intermittens*, I have observed a great many cases of acute aural inflammations which belonged to this class, and which, when treated as intermittent otitis, were so speedily cured, that I have no hesitation in saying that a great number of acute otitides, especially those occurring in spring and autumn, are caused by malarial agencies."

These observations interested me very much, because here in the West, malaria is very common; it appears not only in the various forms of intermittent and remittent fevers, but it shows also its influence in a number of other diseases. For instance, it is a well established fact among physicians, that quinine has a most decided beneficial effect upon the catarrhal fevers so prevalent here in spring and fall; also, that in most neuralgic affections of the fifth nerve, small doses of quinine (with or without pulv. Doveri), yield excellent results.† And among aurists, the use of quinine for acute inflammations of the middle ear is a matter of daily practice sanctioned by its beneficial action in numerous cases. It is not necessary in these cases that the disease shows the intermittent or remittent character of a purely malarial disorder; quinine asserts its good effect also when the inflammation, originating from any cause whatever, is as it were, merely modified by malarial influences. A good instance of this kind is the following case of

Acute purulent otitis as the result of drawing cold water into the nose; inefficiency of local measures; rapid recovery by the internal use of quinine.

* *Deutsche Zeitschr. f. Prakt. Med.*, 1877.

† I can testify from my personal experience to this excellent effect of quinine upon neuralgia. In the spring of the year 1878, I contracted a neuralgia of the left infra-orbital nerve as the result of a cold. By noon the pain was so violent, that I was incapacitated for attending my professional duties. Warm application brought no relief, morphine made me forget my pain only as long as its narcotic effect lasted. After a very bad night, I took at 8 o'clock, A.M., one grain of quinine with one grain of Dover's powder, and repeated this dose every fifteen minutes. By 9 o'clock (*i.e.*, after four doses of the powder), I was released, and remained free from pain all day. The next morning a slight burning and throbbing in the cheek announced the return of the neuralgia, but three doses prevented the attack; and I have ever since been free from it.

A lady, aged 35 years, suffering from chronic nasal catarrh and subjected to sore throat, had, in March, 1876, an acute aggravation of her nasal trouble, and a severe inflammation of the left tonsil. The latter being quickly subdued by applications of nitrate of silver, but the nasal catarrh persisting, the lady, upon the urgent advice of some "good friend," drew up cold water into her nose. She at once felt a sharp pain and a fulness in the right ear, but although the air was very damp and chilly, she insisted upon going out that same afternoon, and went to the theatre in the evening. There, however, the ear began to ache so much, that she was obliged to return home before the performance was over.

April 3d.—Patient had agonizing pain during the night. The ear felt full and heavy, "as if filled with water;" did not hear watch at all. External meatus normal; membrana tympani dull and gray; no trace of hyperæmia; but both sections of Sharpnell's membrane were distended to two large, tense pouches, reaching down to the centre of the drum-head, and separated from each other by a deep furrow in which the handle of the malleus was visible. A puncture drew off a few drops of a clear serous fluid, and made them collapse completely. Leeches behind the ear gave temporary relief, but toward evening the pain recurred and lasted until midnight, when the ear began to discharge.

April 4th.—Meatus filled with a muco-purulent secretion, which was being forced out from the tympanic cavity through a slit-like opening in the antero-inferior section of the drum-head. The pain, moderate in the morning, became unbearable at night; the mastoid process was tender upon pressure, but there was neither redness nor swelling; the external auditory canal was so sensitive that the most gentle injection of tepid water was exceedingly painful. Ordered leeches upon mastoid, followed by warm water poultices; turpentine emulsion.

April 7th.—No perceptible change; persistent pain in the whole right side of the head, always worse at night. In consultation with Dr. Holmes it was decided to discontinue all local measures, and to give quinine (4 grs. every two hours) and an opiate at night if required.

April 8th.—Was free from pain during the whole night; no tenderness of mastoid process; injections of warm water into meatus did not cause any pain. Discharge decreasing.

By April 15th the discharge had ceased and the perforation of

the membrana tympani was healed. The only complaint of the patient was a sensation of fulness, together with some deafness and tinnitus. By the daily use of the air douche, and the continued use of a little quinine (8 grs. *pro die*), all these symptoms were removed, and the ear recovered so well that, after some time, its-hearing power did not show the slightest difference from that of the left ear.

In the foregoing statement I have extracted from the daily records of the case the main points only, still I think the report is complete enough to show the peculiarity of the case. And certainly it is worthy of remark that the inflammatory process so evidently lit up by a local cause, could not be subdued by local treatment; that topical applications seemed to stir up the inflammation rather than to soothe it; especially it has always seemed to me that the paracentesis of the drum-head added to the severity of the inflammation. A very remarkable feature of the above case was the disproportion between the subjective and objective symptoms; the severity and extent of the pain, together with the great sensitiveness of the auditory canal and tenderness of the mastoid process, were symptoms indicative of a very violent, if not complicated, purulent otitis, while the objective symptoms, together with the nature of the discharge, disclosed only a moderate degree of inflammation. Similar observations have convinced me that this symptom is of some diagnostic importance, and when, in the course of an acute otitis, I observed a striking disproportion between the subjective and objective symptoms, I have relied upon quinine with the most gratifying results. Just to show the effect of the early exhibition of quinine in such cases, I may be permitted to give a brief report of the following case:

Acute catarrhal otitis with perforation of the drum-head; rapid recovery by quinine.

On May 18th I was called to see a robust man, 39 years old, who for two weeks had been suffering from a severe inflammation of the right ear. The past five days the ear had been discharg-

ing, but neither this nor any of the various remedies which were applied (warm water, warm poultices, solution of atropia) seemed to give the least relief. The pain extended over the whole right side of the head; there were soreness and tenderness about the ear, although I failed to discover any point which would show that degree of sensitiveness suggestive of mastoid inflammation. Nor was there any redness or swelling behind the ear. The external auditory canal contained a large quantity of sanguinolent pus, and near the drum-head its lining was quite red; at the same time it was so hypersensitive that the instillation of warm water caused the most violent burning pain. The membrana tympani was intensely red; in its posterior half there was a small opening, through which the sanguinolent secretion was coming forth in a pulsating rhythm. I ordered quinine with Dover's powder (āā gr. i every hour), and two leeches behind the ear, but discontinued all topical applications. After twenty-four hours his head was free from pain, and the discharge from the ear was not tinged with blood. After two days the meatus was normal in appearance and sensation; and in two weeks the discharge had ceased altogether and the perforation of the membrana tympani was closed.

Quite recently I had the opportunity to observe a case which, I think, belongs to that strictly malarial disease which Weber-Liel described as otitis intermittens. When the patient came under my care, three weeks had elapsed since the beginning of the malady, and the inflammatory symptoms had become so prominent that at first I was entirely misled in my diagnosis, and for a while entertained serious apprehensions about the case, because I learned the patient had repeatedly been afflicted with affections of tertiary syphilis. How I finally succeeded in recognizing the real character of the disease my notes of the case will show.

Otitis intermittens; intolerance of local treatment; rapid recovery by quinine.

March 2d.—A wealthy merchant of this city, who likes sport and good living, was sent to me by his physician on account of a violent inflammation of the left ear, which had been going on for three weeks with unmitigated severity, and seemed to assume a very alarming character. The patient, 48 years old, complained

of a very annoying and disagreeable soreness about the left ear and all over the left side of the head, but the worst pain was located in the left parietal bone. There was a slight redness over the mastoid region, but no swelling or tenderness, and I attributed the redness to the use of camphor oil and other irritants which had been rubbed in a few days previously. In the subauricular. fossa there were two swollen and very tender glands. In the external auditory canal, muco-purulent secretion; its walls, red and swollen, especially the upper, were sunken down so much that the lumen of the deeper portion of the meatus was narrowed to a horizontal fissure, through which the inspection of the membrana tympani was exceedingly difficult. Still I could convince myself that this membrane was intensely red and perforated, and that the edges of the perforation were swollen and infiltrated. The watch (H. D. =24 inches) was not heard at all by the left ear, and at ½ inch by the right ear; tuning-fork through the skull in *left* ear.

Concerning the previous history the patient could give me no other information but that his disease commenced three weeks ago with violent pain in the left ear and the head, and that for some time the meatus was entirely closed up by a swelling. And his physician did not know anything about the case, as he had been absent from the city until a few days ago; but he informed me of the fact that the patient had had several attacks of syphilitic affections of the bones.

I diagnosticated a muco-purulent otitis, and regarded the tertiary syphilis as an unfavorable complication. Indeed, I looked with a great deal of anxiety upon the great and persistent swelling of the deeper portions of the meatus, and upon the violent pain in the head. I apprehended that the vitality of all structures being greatly weakened by inveterate syphilis, a rapid disintegration of tissue would be the result of the inflammation, or that the inflammatory process was being propagated to the lateral sinus, like in a case* I observed in 1876, where an acute muco-purulent otitis led to phlebitis of the lateral sinus and fatal pyæmia at the end of one week in a tertiary-syphilitic patient. I therefore abstained from any energetic local treatment, simply prescribed a weak solution of boracic acid, but relied mostly upon the iodide of potassium given

* Published in the Transactions of the Ill. State Med. Soc., p. 89, 1876.

in 10-grain doses three times daily. This treatment was kept up four weeks without producing any appreciable change.

March 29th.—The condition of the ear showed no perceptible improvement, except that the meatus was open a little better, allowing a better inspection of the membrana tympani; the edges of the opening in this membrane were very thick and uneven, as if covered with proliferous granulations; the discharge from the ear still the same. The pain quite tolerable to-day; was exceedingly violent yesterday. The edges of the perforation were touched with sulphate of copper by means of a cotton-carrier.

April 1st.—The patient reported of a most remarkably violent reaction, which followed the application of copper. On the 30th the pain in the ear and head was fearful, and the lumen of the meatus was totally closed by swelling. Yesterday the pain was less severe, and the swelling of the meatus began to diminish, but the discharge, which had stopped since the 29th, did not reappear until last night. To-day the state of the ear about the same as on the 29th. The granular edges of the perforation touched with 10-grain solution of nitrate of silver.

April 5th.—Patient reported of a similar reaction like that which followed the application of copper. To-day the *status quo* of the 29th reëstablished.

This repetition of the phenomenon appeared to me very suspicious. At both times the aggravating symptoms followed so closely upon the topical medication that the latter was undoubtedly the cause of the former. But at both times the application was of so mild a character that under ordinary circumstances it would never have caused these violent symptoms; only an excessive morbid irritability could account for this strangely severe effect of a mild local medication.

The result of my treatment extending over four weeks, could be summed up as follows: Constitutional treatment by iodide of potassium had accomplished nothing, and local remedies had shown a decidedly bad effect; all in all, the state of the affected ear was about the same as before I treated it. And from this fact I inferred that the disease was not of the grave nature I at first supposed it to pos-

sess. While I was endeavoring to find a plausible explanation of the strange observations I had made in the case before me, a remark of the patient gave me the key to the solution of the riddle, and further developments showed conclusively the malarial character of the disease, which I now recognized as a case of Weber-Liel's *otitis intermittens.*

The patient informed me that before I made these applications, he had, alternately, a good and a bad day; on one day he would suffer very much of the pain in the head, and on the next day he would feel quite comfortable. On the bad days he would wake up with great pain and soreness about the ear, the pain increasing in violence until the afternoon, when a profuse perspiration would bring relief; in the evening he would feel well but weak, would sleep well and be free from pain all next day; only the discharge and a dull soreness would then remind him of his aural trouble. Further examination disclosed the fact that the patient was living in a locality where malaria in all its forms was endemic, and that he had had intermittent fever several times. All local treatment was suspended at once, and quinine (2 grains every hour) given.

April 8th.—Took twenty grains of quinine every day; had one "bad" day, but the pain was neither so violent nor so persistent as before. To-day should be a "bad" day, but he was free from pain.

April 12th.—Has had no pain since the 6th; no soreness about the ear; auditory canal wider; the granular swellings of the edges of the opening in the drum-head had disappeared, and the discharge was reduced to a very slight mucous secretion. Patient stopped taking quinine yesterday because he felt its effect upon his system; advised to take 8 grains per day.

April 20th.—Head free; meatus of normal width; no discharge from ear; opening in drum-head closed; can hear the voice very well, and the watch when in contact with auricle.

May 20th.—Has been taking quinine, though not very regularly, but has felt quite well. Appearance and hearing of right ear the same as on April 20th, and not changed after air douche.

The unpleasant effect of the topical applications in this case recalled to my mind the very interesting observation recently published in these ARCHIVES by Dr. Roosa. In

his case also every local measure produced a perceptible aggravation of the inflammation, but the patient did better as soon as the local treatment was abandoned and quinine resorted to. This intolerance of the ear for local remedies is a very remarkable symptom which, taken with an evident disproportion between the morbid changes in the ear and the degree and extent of the nervous symptoms, may be regarded as good evidence of the malarial character of the aural inflammation. I believe if we devote greater attention to this matter we shall find malarial complaints of the ear to be more frequent than they have heretofore been supposed to be. Physicians tell us quite often of slight aural discharges appearing in the course of intermittent and remittent fevers; upon closer investigation they might possibly be found to bear an intimate relation to the malarial infection, and to be easily cured by extending the treatment with quinine beyond the febrile period.

In regard to the administration of quinine, I agree with Voltolini,* that small and frequent doses are preferable to the large doses usually given for malarial fevers, and that the remedy must be continued for some time after the apparent recovery of the patient, in order to insure a permanent cure. I usually give one or two grains every one to two hours, with equal parts of Dover's powder, and have the patient take it in a spoonful of tea. I find tea (either cold or warm, with or without sugar) disguises the bitter taste of quinine so well, that even children do not object to taking it in this way. I prefer the powder to the pills for the reason that many persons cannot take pills, and because I often found the sugar-coated or gelatine pills unreliable; at least they disappointed me quite often, when subsequently the quinine powder at once produced the desired effect.

* *Monatsschr. f. O.*, May, 1878, p. 58.

A CASE OF PRIMARY POSTAURAL ABSCESS WITHOUT IMPLICATION OF THE MIDDLE EAR.

By F. C. HOTZ, M.D., Chicago.

J. W., æt. 45, carpenter, had never had earache or any inflammation in or about the ears, but his hearing had, for many years, been a little defective. In the night of January 15, 1879, he woke up with a violent pain behind the left ear, and by the morning the left mastoid region was swollen and tender. It was blistered, leeched and poulticed, but he experienced no relief until after two weeks, when pus was discharged from the external auditory canal. With the appearance of pus the pain abated, and the swelling behind the ear subsided. After two weeks, however, the otorrhœa ceased, and at once the pain and swelling behind the ear returned, to subside again when, after the expiration of another week, the purulent discharge from the meatus reappeared. This alternation of a purulent discharge and a painful tumefaction had been going on six months; the only change the patient could observe during this long period was that the swelling gradually extended downward into the tissues of the neck. In the meantime his health broke down completely; his appetite and sleep were gone; his flesh wasted away, and his brain was wrought up so that he could not read two lines without being dizzy and nauseated. When I first saw him July 24th, he was a complete wreck, physically and mentally —pale, emaciated, despondent. The integument of the left auricle and postaural region was deep red but not glistening, which condition I attributed to the prolonged use of poultices (which had been used, since the beginning of the disease, almost continually). There was considerable swelling of the postaural

region, but no tenderness. The swelling was very slight over the mastoid region; it increased very perceptibly at the tip of the mastoid process, and was very marked and fluctuating in the retro-maxillary or subauricular fossa. The upper end of the sterno-cleido-mastoid muscle was swollen too, and the patient held his head inclined toward the left shoulder, with the face turned to the right side. Any change of this position was painful. It was also very difficult for the patient to open his mouth far enough to get a small morsel of soft bread between the teeth.

The external auditory canal contained a moderate amount of muco-purulent secretion, but its integument was neither red nor swollen. The membrana tympani was gray, retracted and without a light spot, but no perforation could be found. In the posterior wall of the meatus, at the junction of the osseous and cartilaginous portions, I discovered a small, semi-globular, tit-like elevation, with a small opening upon its vertex. A fine probe inserted into this fistula could not be advanced toward the tympanic cavity or the mastoid cells, but when properly bent it could be passed on in a downward direction pointing toward the tip of the mastoid process; and when I pressed upon the integument of the subauricular fossa, the tit-like tumor of the meatus discharged a great amount of muco-purulent matter. Hearing power for the watch was $\frac{1}{24}$, but the right ear proved almost equally deaf ($\frac{2}{24}$), and its membrana tympani showed the same dull, opaque, and indrawn appearance. Tuning-fork from the forehead was heard by the left ear. Tinnitus in both ears, and chronic pharyngitis.

This was the condition of the patient at my first visit. The absence of preceding otorrhœa together with the absence of all evidence of acute inflammation of the tympanum, pointed clearly to the mastoid region as the primary seat of the trouble. The hearing of the affected side was greatly impaired, it is true, but so was the hearing of the right side; and both drum-heads exhibited the same condition peculiar to chronic non-suppurative inflammation, which evidently had nothing to do with the present mastoid disease. The question then arose, was it primarily an abscess of the mastoid cells, or a phlegmonous or subperiosteal suppuration? I dropped the first supposition at once as untenable, because it seemed highly improbable that a sup-

purative inflammation within the mastoid cells would result in a perforation of the bone rather than in an extension to the contiguous membrane of the tympanic cavity.*

The phlegmonous origin of the abscess also seemed very doubtful, inasmuch as the pus of a phlegmonous abscess of the postaural region, unless early liberated by an incision, is certain to burrow down into the cellular tissue of the neck, creating sinuses and fistulous ducts under the integument. Was it likely that a phlegmonous inflammation, known and dreaded for rapidly spreading over large surfaces, should, after a duration of six months, be still confined to the small area in which it originated?

On the other hand, there were several features which pointed to the periosteum as the original seat of the inflammation. Its limited extent after six months, together with the swelling of the upper end of the sterno-mastoid muscle, which Dr. Knapp considers very characteristic of external mastoid periostitis,† and the fistulous opening at the junction of the cartilaginous and osseous meatus, from which a probe would pass downward and backward to the anterior aspect of the mastoid process—these were, in my mind, pretty good evidences for the subperiosteal nature of the abscess. But whichever might have been its origin, there could be no question as to what to do.

I explained to the patient the necessity of giving the pus a free outlet by a large incision. My proposition was accepted by the patient, and on July 27th, an incision was made behind the left ear from the line of the orifice of the external meatus to the insertion of the sterno-mastoid muscle. No pus was found, and periosteum and bone appeared healthy. But when I extended the incision one inch further down into the more swollen tissues of the subauricular region, I opened a cavity lined with granulations, and containing a small amount of muco-purulent secretion. Backward it extended under the sterno-mastoid muscle, and in its

* Upon the same ground, I doubt the correctness of Webster's diagnosis of Cases III and IV, reported in Vol. viii, No. i, of these ARCHIVES, *as primary inflammation of the mastoid without demonstrable inflammation of the middle ear, with a fistulous communication between the mastoid cells and the external auditory canal.* In either case, the probe failed to prove this communication.

† See Knapp's report on "primary acute periostitis of both mastoid processes," in Report of First Congress of International Otological Society, 1876.

anterior wall I noticed the mouth of a fistulous canal, which, by probing, was found to lead forward to the anterior aspect of the mastoid process, where it widened out to another spacious cavity. A probe suitably bent and hooked into the fistular opening in the external auditory meatus, met the other probe in the cavity behind the auricle. No denuded bone was found. After this exploration a drainage tube was inserted, and the tube dressed with carbolized compresses.

The patient experienced great relief, the pain disappeared, and the swelling gradually subsided. The only difficulty was that the soft drainage tube very often came out during the night, and the drainage thus being interrupted the abscess was filled again. On August 11th, therefore, I inserted a slightly curved silver canula of the caliber of a large Eustachian catheter. This answered the purpose very well, and greatly facilitated the daily cleansing of the cavity by injections of boracic acid.

August 26th.—The injections brought away two large shreds of necrosed fibrous tissue (periosteum), with a few small spicula of bone adhering to them. The fistula in the external auditory canal is sealed by a firm scar.

September 8th.—Wound behind the ear cicatrized. External auditory canal normal; membrana tympani as before; H.=$\frac{1}{24}$; tinnitus, which was relieved slightly by the air douche. The patient, however, was so much pleased with this result that he did not care for "that little noise" in his ears. He resumed his work as a carpenter, and when I saw him in December, he was a healthy and happy man.

Observations like the above have of late become quite interesting, since Prof. Voltolini first attracted the attention of aural surgeons to these primary postaural abscesses. But while he (and Turnbull also) regarded them as the result of phlegmonous inflammation,* other observers (Blake,† Knapp,‡ Roosa§) believe in their periosteal origin. Probably they may originate from both sources, just as the whitlow sometimes results from phlegmon, sometimes from periostitis; and it may, therefore, perhaps be a

* See "Die Acute Zellhautentzündung in der Supra and Post-auricular Gegend;" *Monatsschr. f. Ohrenhlkde.*, Dec., 1875 and Sept., 1877.

† ARCHIVES OF OPHTHAL. AND OTOL., vol. v, p. 290.

‡ Report of First Congress of International Otological Society.

§ ARCH. OF OTOLOGY, vol. ix.

good plan to use for all these cases an indifferent name like "primary postaural abscess," or, "primary external inflammation of the mastoid" (S. M. Burnett). Practically it is immaterial which view we take; for in either case a free and deep incision, together with good drainage, is indicated.

One point seems to me not undeserving of notice. It is, perhaps, a significant coincidence, that in all cases which were not early interfered with by operation, the abscess established a communication with the external auditory canal, the perforation being always found at the junction of the cartilaginous and osseous portions. Such communications were observed by Voltolini in two cases (lasting three and nine months), by Turnbull * in one case (lasting four months), by S. M. Burnett † in one case (duration not stated), and in the above case (lasting six months).

* The Mastoid Region and its Diseases, *St. Louis Med. and Surg. Journal*, February, 1880.

† See ARCH. OF OTOLOGY, vol. ix, p. 145.

ON MÉNIÈRE'S COMPLEX OF SYMPTOMS.

By Dr. J. GOTTSTEIN of Breslau.

Translated by James A. Spalding, M.D., Portland, Maine.

ALTHOUGH much study has been devoted to the physiological significance of the semicircular canals, it is still an open question whether they perform an acoustic function, as we must conclude from their relations to the auditory nerves, their close connection with the cochlea, and, further, from their development and comparative anatomy,—or whether they are to be considered as organs of equilibrium, as seems probable from Flourens' experiments. A similar obscurity envelopes the nature of those affections which begin with disturbances of hearing and attacks of vertigo, and which, from the similarity of their symptoms with the appearances following destruction of the semicircular canals, are referred to an affection of these organs. We still wait in vain for physiological experiments and pathological observations to support one another in solving this interesting problem.

All that we can assume as established beyond a doubt is, that affections in the sound-conducting apparatus can, under certain circumstances, produce transitory disturbances of the equilibrium without justifying us in assuming organic changes in the labyrinth; and secondly, that in affections of the middle ear, attacks of vertigo may associate themselves with deafness in a few rare cases, when the morbid process has invaded the labyrinth. Here, however, we leave unexplained why the disturbances of equilibrium appear during such secondary labyrinthine affections in some cases

and not in others, as well as their mode of origin. We assume, indeed, that the semicircular canals transmit the disturbances of motion, but it is difficult to prove from these observations, whether they are *only organs of equilibrium, or whether they only accidentally influence the central nervous organ.* For, on the one hand, the experiment on animals shows what slight causes (hemorrhage, greater or less mechanical irritation, in which it is hard to decide whether its influence is exerted more upon the labyrinth or the centre) modify the violence and type of the disturbances of equilibrium. On the other hand, the symptoms of auditory vertigo are only imperfectly explained by accepting the general view, that the vertigo in affections of the middle ear is due to intralabyrinthine pressure alone. How often we are forced to support such a pressure in affections of the middle ear, although no disturbances of equilibrium are noticed! Why do the attacks of vertigo in many cases appear only *paroxysmally* without being followed by demonstrable alteration in pressure? *Must* we not assume that every affection in the cochlea modifies the movement of the endolymph in the canals, and that disturbances in equilibrium must always be connected with such an affection? The cases of transitory cerebral disturbances after irritation of the external auditory meatus by foreign bodies (insects), prove that other factors must here come into account; *e. g.*, I have seen patients almost faint away when the ear speculum was introduced. Cold water often causes vertigo, while warm water is well borne, analogous to the observation of Schmidekam, that the pressure of a column of 54–117 *cm.* of cold water, caused pain, vertigo, and nausea to fainting, which did not ensue on using warm water (25° R.).

I do not intend in this paper to discuss the affections which we regard as proceeding from the middle ear, but I will try to throw some light on those cases alone, in which we can exclude all affections in the sound-conducting apparatus; cases in which we have to assume that the auditory nerve is affected centrally, or in its course, or in its peripheral expansion: these cases I would like to distinguish as

the *neuropathic form of Ménière's disease.* It is often difficult to make a differential diagnosis of nervous deafness, and still more so of the Ménière's complex of symptoms. For a long time I was inclined to consider the neuropathic form as an extremely rare disease, for I saw but few cases of "auditory vertigo" in which pathological alterations in the *Mt* and in the middle ear could not be demonstrated. However, I soon felt convinced that after excluding all doubtful cases, many still remained in which, even when alterations were present in the sound-*conducting* apparatus, we were obliged to refer the cause of the disease to the sound-*perceiving* elements, as *e.g.*, in those cases of vertigo with nearly sudden and absolute destruction of hearing. For neither our pathological experience nor our physiological views of the significance of the sound-*conducting* apparatus, allow us to imagine a case in which an affection of this apparatus could be followed by so sudden a destruction of hearing, that not even the loudest sounds could be perceived by air- or by bone-conduction. I believe that we must refer this symptom exclusively to a nervous affection. Indeed, I will not deny that there are cases of "neuropathic auditory vertigo," followed by a gradual diminution of hearing; but these cases are very rare, and differ so decidedly from those beginning with complete abolition of hearing, that we are right in regarding the latter by themselves.

We find two groups of cases in which deafness and disturbances of equilibrium are united:

1. Those in which the patients—usually children—suffer from *meningeal* symptoms, for a longer or shorter period, recover completely, but remain deaf and walk staggeringly.

2. Those in which the *deafness* and *vertigo* appear *instantaneously*, without any change in the general health.

Authors vary a great deal in their views concerning the nature of the first group. Voltolini explains the symptoms as a genuine affection of the labyrinth, and while he believes that many cases of otitis labyrinthica are mistaken for meningitis, others, like Knapp, acknowledge the possi-

bility of an idiopathic primary inflammation of the labyrinth, but believe that in most cases the affection is only secondary and subsequent to simple or cerebro-spinal meningitis, puerperal fever, and other pyæmic affections.

Before going more deeply into the subject I would like to ask: Do the symptoms observed in this disease really correspond to the appearances observed in experiments on animals, after incising and destroying the semicircular canals? We can, in these experiments, distinguish two stages, which gradually pass over into one another; first, the heads of the animals move to and fro, the violence of the motion being in direct proportion to the mechanical force applied in the operation, and the amount of hemorrhage. The animals stagger when they try to move; sometimes they fall over backward, and when brought to rest, their heads move to and fro as before. This condition continues ten to fifteen hours, and somewhat longer in the case of mammals. *From this time onward*, the automatic movements of the head are less frequent, and only executed when the animals are roused and struck. *Later still*, they cease, while on the other hand, the head hangs awry, and the animals turn it about so that the occiput touches the floor. This latter condition may continue for months, and diminishes but slightly.

On the other hand, the symptoms in the disease in question do not agree with these appearances at any stage or in any respect. In and by themselves the results of experiments on animals are only to be accepted with great reserve as regards pathology, and yet the differences are so striking that particular attention ought to be called to them. First of all, there are no forced movements of the head and body in the disease which we are studying; the cases rarely begin with convulsions, but, when convulsions appear, they do not differ from those which introduce acute affections in children; and children, as we know, are chiefly attacked with this disease. We also miss the faulty carriage of the head, and the impossibility of its making suitable movements, which are so characteristic in animals which have undergone the operation. The only point in common, in

patients of this sort, with animals whose semicircular canals have been cut, is the staggering gait. This seems all the more remarkable, as in operated animals the staggering is dependent upon the perverse carriage of the head. If we support the heads of these animals, they do not stagger; *e.g.*, I found, after partial destruction of the semicircular canals in rabbits, that they could not hold their heads erect, and that they staggered and executed forced movements when they tried to run, but when I supported their heads by a ligature uniting the skin of their heads and backs, they could again move about correctly. When the ligature became loose, the forced movements reappeared, and again disappeared when the ligature was tightened. Now I have never been able to discover any such characteristic in the motor disturbances of patients suffering from "auditory vertigo," nor to convince myself that they differ at all in type and direction from the seizures of vertigo observed after the most varying affections of the brain and its membranes. Hence, I think that clinical observation offers no real support for the hypothesis that the semicircular canals are organs of equilibrium, and so much the less, as I believe it possible to prove that the affections of the ear, as Knapp had already partially declared, are associated with a meningitis. Leaving aside all my older experience, I cite as proof on this point, twenty-five cases of deafness which I observed between March 22 to October 28, 1879, the deafness developing with feverish symptoms, and being associated with disturbances of equilibrium. Two of the cases being referable to scarlatina and two to typhus, are not included, because the origin of the aural affection could not be precisely determined from the clinical history.

The very fact that so large a proportion of cases of "otitis labyrinthica" (ten per cent) were found amongst the cases of ear diseases which came under my care during the above period, must of itself create surprise. If I exclude six cases, which date a year and more backward, there are nineteen cases between December, 1878 and August, 1879. Seven of these came from Breslau, five from near Breslau, and four from more distant districts. This remarkable co-

incidence of the same affection in time and place, seemed to be no mere chance, and I could not help thinking of an epidemic. The only case under regular medical treatment from the first, was diagnosticated as "cerebro-spinal meningitis." In one other case, however, an epidemic of cerebro-spinal meningitis could be assumed, because the symptoms were typical of the disease, and secondly, because five children (two of whom became deaf) were attacked with the same disease in the same village.

Two other cases also exhibited the symptoms and sequelæ of cerebro-spinal meningitis; fifteen cases remain in which we have no history of the nature of the feverish affection from which deafness developed itself. I will here say, that in most of my cases in the early part of this period, I did not pay much attention to cerebro-spinal meningitis as the cause, but such a supposition cannot now be rejected. Meningitis was undeniably present in the following case, which is also of interest in other respects.

CASE I.—E.H., æt. 9, was brought from Rankau Sept. 10th. She had always been healthy, had never suffered from any disease of the ears, but fell ill ten weeks before with feverishness and vomiting. Deafness was noticed on the third day; the child complained of roaring, squeaking and music in the ears. At the same time the right eye became congested, the pupil contracted, and vision diminished. The headache was violent from the first. No medical help was summoned. The child was well in four weeks, but she staggered about and was deaf. An examination of the ears revealed no abnormity. Dr. Cohn of Breslau found in the right eye the remains of iritis, numerous posterior synechiæ, and deposits on the capsule. The vitreous body was full of thread-like opacities, the papilla engorged, and the retina hazy. Dr. Cohn had no doubt from the condition of the patient, that she had suffered from meningitis.

Moos in his paper "*On the combined occurrence of affections of the organs of sight and hearing*" (these ARCHIVES, vol. vii, p. 482), says: "Combined visual and auditory disturbances occur, both in sporadic and epidemic meningitis. The subsequent impairment of hearing is only ex-

ceptionally of a low degree, absolute deafness being the rule. It is chiefly caused by purulent inflammation, and its consequences either at the origin or in the course of the auditory nerves, or in the labyrinth; sometimes also in the tympanum. The causes of impairment of sight are either purulent-choroiditis (Knapp), or neuro-retinitis in consequence of neuritis descendens (Schirmer)." The case just described was complicated with plastic irido-choroiditis and neuro-retinitis. We can only suspect the pathological process upon which the affection of the ear depends. It is very probable that both processes are due to meningitis, and Knapp is correct in assuming that the morbid process passes from the meninges to the ear, and to the eye, by one and the same path. I believe that my patient suffered from cerebro-spinal meningitis, in spite of the absence of many characteristic symptoms, because two cases from the same district were under my care at the same time, and secondly, because the district physician assured me that there was an epidemic of cerebro-spinal meningitis in that locality. Our diagnosis of meningitis seems somewhat less certain in the following case.

CASE 2.—B. H., æt. 3, of Breslau, fell ill in February with violent fever, headache and somnolence, but did not vomit. The fever abated in a few days; the child became convalescent, but remained deaf, and staggered when trying to walk. During the acute stage, the mother had noticed that the child spoke but little, and only prattled a few words. I saw the child March 22d; she was absolutely deaf, staggering about when walking, could not move her tongue, and spoke only a few words imperfectly. The mother assured me that the child had always spoken clearly before her illness, and now spoke more words and more clearly than just after her sickness. I discovered nothing abnormal on examining the organ of hearing, in so far as it could be done in a child of her age.

In spite of the short acute stage and the absence of vomiting, I believe that this child suffered from a basilar meningitis, and that the disturbance in speech depended upon a paresis of the hypoglossus, which, as well as the auditory nerve, was affected by the morbid process.

A similar case with more pronounced symptoms, follows by way of illustration.

CASE 3.—F. G., æt. 4, was attacked in June, 1878, with violent vomiting, intense headache, fever, and an exanthem which was regarded as scarlatinous. On the tenth day the child grew hard of hearing, and on the eighteenth day completely deaf. Convalesence ensued, but the child lost her speech, *i.e.*, her collection of words was reduced to a few, which were indistinct and almost incomprehensible. Her memory also became weak, and she staggered when walking. Desquamation did not follow, nor was angina present in the beginning of the disease. I saw the child September 6, 1878; it was well nourished, bright, healthy, and could speak a few words distinctly. Nothing abnormal could be discovered in the middle ear. The condition improved so much during the exhibition of potass. iodid. that, in spite of the permanent deafness, the child gradually gained more words, and now recalled many things which had happened before her illness, but which up to this time seemed wholly to have escaped her recollection.

I have no hesitation in regarding this affection as a meningitis. The exanthem could not have been scarlatinous, as desquamation did not follow; it was probably a miliaria, such as occurs in cerebro-spinal meningitis. The disturbance of speech was probably central, in favor of which the striking and gradually disappearing weakness of memory also testifies. I cannot decide whether alalia was present as a result of the paresis of the hypoglossus, for when I first saw the child, the movements of the tongue and pronunciation of words were no longer defective.

Disturbances of speech in connection with affections of hearing are rarely observed except when depending upon the latter (deaf-mutism). I shall mention further on a case of aphasia which developed itself simultaneously with an "apoplectic auditory vertigo." Knapp also mentions in his paper, "*A clinical analysis of inflammatory affections of the middle ear*" (these ARCHIVES, vol. ii, No. 1, p. 207), a case of alteration of speech, which he characterises as defective articulation, but expresses no opinion regarding its

connection with the deafness. In Case 10 (ib., p. 256), he mentions that the articulation had changed a great deal in the six months' duration of the disease, although the patient still spoke distinctly. In this case again we cannot discover at what period the defect in speech developed itself. Lucae,* on the other hand, refers to a case of "nervous deafness," with defective speech in an epileptic patient. Remak who examined and treated the patient with electricity, described the defect in speech "as a mixture of stuttering and scanning," and regarded it as central. I think I am right in assuming a cerebral meningitis in both of my cases of combined defect of speech and hearing.

Out of nineteen cases, we have found six in which a meningitis could probably be regarded as the starting point of Ménière's complex of symptoms. In the thirteen remaining cases, feverishness and violent headache were present; vomiting was not observed at first in two cases; the mind was more or less affected in nine; in three cases, fever, headache and vomiting were the only symptoms preceding the affections of the ear. The patients, with one exception, belonged to the lower classes, and lived amidst bad sanitary conditions; their age varied between 2—16 years. If we take all these points into consideration, and add that an epidemic of cerebro-spinal meningitis had raged in Breslau and Silesia since last autumn, we have no hesitation in connecting these cases of "auditory vertigo" with feverishness and other peculiar symptoms, with this epidemic. All authors agree that cerebro-spinal meningitis almost exclusively attacks children under fifteen, belonging to the lower classes, and that during such an epidemic, cases are observed which recover rapidly after mild initial symptoms, and are called abortive cases. Similar cases occurred during the Silesian epidemic. Are we not, therefore, justified in classifying the slighter cases of deafness with disturbances of equilibrium under the abortive cases? Is not this as justifiable as to believe that children otherwise healthy could be affected, without external cause, by an otitis interna with such peculiar symptoms?

* *Arch. für Ohrenheil., Bd.* xiv, *Heft.* ii, *p.* 135.

I must confess that I have never been able to see why the peripheral terminal apparatus of the auditory nerve, which seems more protected against external noxious agencies than any other special organ of sense, should be the one most spontaneously affected.

Our argument would, however, be defective if we did not succeed in proving a secondary origin in every sporadic case. Such a task is indeed difficult, because the patients usually consult the aurist when the acute stage has passed by, so that it is difficult to prove any connection whatever with an epidemic, especially in patients who live at a distance; still we can do this in some cases. It will be remembered that I excluded from my cases of otitis labyrinthica observed between March and October, all those in which the affection had developed itself more than a year before. Amongst the cases thus excluded, was one from Bendzin, a small village in Poland, with twelve hundred inhabitants. In 1878, another child from the same place came under my care with the same symptoms, and if I compare the period of the acute stage in both cases, I find that they differ but a few weeks from each other. At a later date, I saw a third case from the same village. This coincidence of time and place is no mere chance, and I am convinced that many cases, apparently sporadic, can be referred to an epidemic. The fact that cerebro-spinal meningitis propagates itself very unevenly, may explain why "otitis labyrinthica" is seen so often by some observers and so rarely by others. Many cases, of course, are referable to meningitis simplex. Hence I have great doubts regarding the appearance of a *genuine* otitis labyrinthica.

Moos ("*Historical and critical remarks concerning the deafness following cerebro-spinal meningitis.*" These ARCHIVES, vol. i, p. 621) refers to the frequency of nervous deafness after cerebro-spinal meningitis, and doubts a primary inflammation of the membranous labyrinth, until an autopsy has proved it. My chief aim has been to prove the probability of a secondary origin in a large number of cases which seem to offer the clinical picture of a primary otitis interna.

I regret that I have no experience from pathologico-anatomical facts regarding the nature of the morbid process, which attacks the organ of hearing in this disease, *i.e.*, whether the auditory nerve is injured at its central origin, or by compression at its point of exit, or by a neuritis descendens or whether an inflammatory process has attacked its terminal expansion in the cochlea and vestibule. I will, however, notice a few important points on the meaning of the symptoms. I do not remember a single case of "deafness with vertigo," which developed itself with the symptoms previously described, where the deafness was *one-sided.* In so far as this can be determined, in the case of older children, the deafness appeared in both ears simultaneously, and was always total. The disturbances of equilibrium were proportionately slight and gradually decreased with time. Oftentimes they only appeared in the dark, or when bearing some heavy load. The uncertain gait of the children, especially soon after the acute stage, was often referred to bodily weakness, and it might be worth while to discover, whether disturbances of equilibrium were noticed in the convalescence after cerebro-spinal meningitis which had not led to deafness.

The following case is typical of the so-called milder cases, in which, however, it would seem that the nerve centre was affected.

Case 4.—H. K., æt. 15, was suddenly attacked, February 17, 1879, with fever, violent headache, vomiting, and pain in his limbs. He lay in an apoplectic condition, and ate nothing. This condition lasted until the 18th. Late at night the child awoke and called out to its mother: "Mother, I am deaf, for I can see father cough, but cannot hear him." Dr. Fränkel, who saw the patient on the 19th, at first thought it a case of otitis labyrinthica, but considering the fever and stupor, concluded it might be meningitis. The fever having abated, and the mind being clear, I was called in consultation, February 21st; sensorium clear, no fever, the patient very weak. His only complaint was of moderate headache, and dreadful roaring in both ears. He staggered so much on leaving his bed that he had to be led. The deafness was complete. Nothing abnormal could be discovered in the organ of

hearing. Our prognosis was unfavorable as regards a cure. Iodid. potass. was ordered. The boy recovered very gradually, but his gait continued staggering and uncertain in the dark for several months. His deafness is such that when he was present at a salute, on the Emperor's birthday, he said he could see the tumult, but could not hear the salute.

The clinical picture is quite different in the second form of "neuropathic Ménière's disease," which, from its suddenness, we call *apoplectiform.* I believe that this form is much rarer than the other, as I have seen but three genuine cases in thirteen years. All of these cases were in adults belonging to the better classes, and are here communicated in brief.

CASE 5.—Mr. D., æt. 82, a minister, from Upper Silesia, consulted me, September 7, 1879. His ears had never been affected, and he had complained simply of rheumatic pains. Several months ago, after finishing his prayer from the pulpit, he noticed that the organ did not play, as usual. He expressed his surprise to the clerk, and now noticed, to his horror, that he was deaf. His general health remained good, but his steps were uncertain, and he suffered from violent roaring in his ears. I could find no explanation of the deafness in the condition of his ears. I noticed, however, that the patient not only walked unsteadily, but that his gait was like that of a cock; he also complained of forgetfulness of words (amnesia) and of the expressions for certain ideas (aphasia). I referred the patient to Prof. Berger, who diagnosticated tabes, with some cerebral symptoms.

I think I have a right to connect the affection of the ear with tabes. Disturbances of hearing are very rare in cases of tabes, in comparison with those of sight. Eulenburg* has seen four cases of disturbance of hearing in sixty-four cases of tabes. Pierret describes two cases of tabes with symptoms of Ménière's disease, in which the hearing was only diminished. So far as I know, we have no pathological experiences on this point; still, I do not believe that the labyrinth is the seat of the disease, but that the auditory nerve is affected in the anatomical process of tabes. I be-

* *Lehrbuch der Nervenkrankheiten.* Theil ii, p. 453.

lieve, especially in my case, that the nerve was affected at its central origin; the suddenness of the attack and the complete deafness on both sides favor this view.

Here follow two cases which closely resemble the one just reported.

CASE 6.—December 13, 1878, I visited Mr. H., a woollen-commission merchant, who had suffered from leukæmia for four months. The spleen was enormously enlarged, and the blood showed the characteristic increase of white corpuscles. The patient was still carrying on his business. December 5th, he suddenly became dizzy on the street, and had great difficulty in reaching his home, where he sank to the floor, vomited repeatedly, and suffered from loud roaring and deafness in his right ear. This condition continued until the 8th, when he noticed that he was deaf in the left ear also. He was at the same time affected with vertigo, so that he could not sit upright in bed. When I saw him, December 13th, his general condition was fair; he had no fever; his deafness was complete; and he begged me particularly to relieve him from the disagreeable roaring which he located in the occiput. At 6 P. M., the patient suddenly lost his power of speech, and could only utter a few incomprehensible sounds. Still, his mind was clear; he wrote what he desired; and answered clearly in writing all the questions put to him. He lost his consciousness on the next morning, and died a few hours later with symptoms of paralysis of the brain. An autopsy was not allowed.

CASE 7.—Mrs. S., æt. 56, has suffered from leukæmia for several months, with enormous enlargement of the spleen. Sudden deafness had also lately appeared. I visited the patient in consultation, November 6th, and was informed that sudden deafness had affected the left ear a fortnight ago, and the right ear within two days. The patient was very anæmic, suffered with hemorrhage from the nose and pharynx, complained of violent sensations in both ears, and could not hold her head erect, because she felt as if it did not belong to her body. Her bodily weakness prevented her leaving her bed. I only examined the *Mtt* and found them normal. The patient's condition allowed no further interference. Her strength gradually declined, and she died on the 27th. An autopsy was denied in this case also.

No one can object, if I refer the cause of these two cases

of Ménière's complex to leukæmia.* The hemorrhage from the nose and pharynx in the last case indicates that the functions of the auditory nerve were interfered with by a hemorrhage at some point in its course. I speak in this vague way with a purpose, because I do not believe that clinical observation alone can decide the localization of the hemorrhage. There was no visible hemorrhage in the first case, but the rapid appearance of the aphasia, would justify us in assuming its presence. We are also to notice that both ears were affected, as well as that these cases of the apoplectic form of Ménière's disease were all of a secondary nature. I know that I differ from others on this point, but if my slight experience is indecisive, I still believe that my first case (Case 5) should put us on the watch for cases of apoplectic deafness. This patient had no presentiment of his spinal affection, and as such incurable aural patients usually disappear from the sight of the specialist, many a case may remain unobserved in its future course.

I shall be glad if my communications excite interest in deciding the question whether a primary affection of the auditory nerve, in its course and its terminal expanse, occurs so frequently as has hitherto been assumed. The only decisive cases, however, will be those which are accurately observed during life, and verified by an autopsy.

* The analogy with disturbances of sight after leukæmia is quite plain. It is remarkable that leukæmic ocular affections are always double. (LEBER, *Kraukheiten der Netzhaut und des Sehnerven.* Handbuch der ges. Augenhlkde. Band v, p. 599.) Diffuse or hemorrhagic retinitis is usually discovered to be the cause.

REPORT ON THE MEETING OF THE AMERICAN OTOLOGICAL SOCIETY, HELD AT NEWPORT, R. I., JULY 21, 1880.

By. H. KNAPP.

In anticipation of the publication of the "Transactions of the Thirteenth Annual Meeting of the American Otological Society," our readers will probably not with indifference accept a short report of the proceedings. The meeting was scantily attended, and the number and scope of the papers presented were limited, though their contents and the discussions were not devoid of importance. Some members, when they had had "their say," were not seen again at the meeting.

The president, Dr. A. H. Buck, and the vice-president, Dr. C. H. Burnett, being absent, Dr. J. Orne Green, of Boston, was called to the chair.

The first paper was by Dr. H. N. Spencer, of St. Louis, on a case of *aneurism of the middle meningeal artery, from traumatism*. A man, æt. 68, was fired upon with buckshot, which struck the left side of his head. He fell from his horse, and lay on damp ground for two hours. When he came to, he was very deaf, but since that time has heard the most distressing noise in his head. The noise is synchronous with the pulse; aneurismal bruit unmistakable. *Mt* intact. No labyrinthine vertigo. The ball had entered the cranium in the region of the left middle meningeal artery and come out through the pharynx. Treatment improved the hearing so that H on the left side became better than on the right.

Dr. C. J. Kipp, of Newark, N. J., had observed a similar case. A lady fell; had aneurismal bruit, which could be stopped by compression of the carotid. The noise diminished in the course of two years.

Dr. J. O. GREEN, of Boston, presented *several pathological specimens.*

1. Of *phlebitis of the lateral sinus and the emissary vein,* of a case published in the *Boston Med. and Surg. Jour.*, and in the *Am. Jour. of Otol.* II. 2.

2. *Necrosed inner table of mastoid.* The case is published in the *Bost. Med. and Surg. Jour.* Chronic otorrhœa, implicating mastoid. Mastoid chiselled away; the necrosed inner table was removed; the dura mater laid bare. Rapid recovery. (See a similar case by Michael in this number of the ARCHIVES.)

3. History. The patient was totally deaf on both sides. Otorrhœa; abscess below mastoid; paralysis of facial and other nerves. Symptoms of syphilis. *Mtt* perforated. Both temporal bones enlarged. Noises. Pain. Potass. iodid. 4.00 daily; no relief. Vertigo. Mastoid trephined; was found sclerosed. Death. *Autopsy.* Calvarium eroded; numerous syphilitic growths. Mucous membrane of tympanum swollen, filling the whole cavity. *Universal hypertrophy of bony walls of drum cavity. Mastoid totally sclerosed.* No pneumatic cells. Stapes movable, but enveloped in soft material. The labyrinth has not yet been examined.

4. *A perforation of the Mt closed by a membrane starting from behind the Mt.* History. Purulent otitis media with labyrinthine symptoms. Mastoid drilled without reaching the antrum, but the symptoms were relieved. Death. Complete sclerosis of mastoid.

From the DISCUSSION it appeared that the opening of the mastoid with the chisel is not much in favor in America; the trephine is sometimes used, but the drill is preferred.

Dr. KIPP, of Newark, read a paper on *ear affections of inherited syphilis.* He had thought that he could say something new, but found himself antedated. (Literature in the reporter's paper on the same subject in previous number of the ARCHIVES.) He had observed five cases in children, all girls, æt. 2, 6, 8, 13 and 16 respectively. The deafness was preceded in four cases by parenchymatous keratitis; in one the keratitis occurred before the deafness. In one case there was a moderate impairment of hearing for some months, in the others the loss of hearing was sudden. Tinnitus, dizziness, staggering. *Mtt* had the appearance of chronic catarrh; in one case it was hyperæmic. Potass. iodid. was administered. Improvement was noticed only in the case with hyperæmia.

Dr. E. WILLIAMS, of Cincinnati, related a case of the same kind, in which total deafness was left.

Dr. JOHN GREEN, of St. Louis, related another case where the deafness was first in one ear.

This was thought exceptional, since the deafness is almost always bilateral, and therefore might be assumed of cerebral origin rather than labyrinthine.

Dr. H. KNAPP does not believe this to be a strong argument, as in traumatic and other affections of the ear both petrous bones commonly show the same lesion. The tendency toward simultaneous and symmetrical affections seems to be a peculiarity of our auditory organ, pointing to a very intimate connection between the two ears. This is certainly much more pronounced than in our visual organ. In cerebro-spinal meningitis he recollects no case of only one-sided deafness, whereas one-sided blindness is quite common. If the labyrinthine origin of the deafness in this disease is still doubted by some physicians, the cause of the blindness in the vast majority of cases is unquestionably intra-ocular, from purulent choroiditis, the nature of which is metastatic, just as the inflammation of different joints in the same disease.

Dr. BLAKE said it would be desirable that Dr. Knapp collected and published his observations on the occurrence of both eye and ear affections in cerebro-spinal meningitis, which Dr. K. was quite willing to do.

Concerning the existence of absolute deafness, Dr. BLAKE mentioned that Professor Graham Bell had examined a deaf-mute (from scarlet-fever) in the most varied manner, and found that the patient heard no sound whatever. An electric battery produced no reaction.

Dr. C. AGNEW, in the treatment of syphilitic ear disease, prefers mercury to iodide of potassium; he recommends the use of Hg. with full force, *i. e.*, to produce mercurialism in 24 hours, principally by inunctions.

Dr. KIPP read a paper on *congenital aural fistula*, of which affection he had observed five cases, in four bilaterally. It was situated at the beginning of the helix. Some secretion could be squeezed out. In four of the cases a probe was introduced in a downward and forward direction. There was no other disease in these patients, except that three had sebaceous cysts in front of the tragus. He thinks that this so-called branchial fistula has nothing to do with the development of the ear.

Dr. KNAPP remarked that in this statement Dr. Kipp did not stand alone, as the same opinion was expressed by Urbantschitsch, whose recent text-book, by the way, was quite admirable, and surely the most exhaustive book for reference on otological subjects we possess up to this day.

Dr. H. KNAPP read a paper entitled: *Some remarks and observations on bone-conduction.* He has always entertained the idea that immediate bone-conduction, *i. e.*, without participation of the conducting apparatus of the middle ear, can produce only quantitative perception of sound,—the existence of sound, and, perhaps, indistinctly its pitch,—but not qualitative perception,—clangtint, melody, harmony, articulate speech,—just as the eye, without participation of the regular light-conducting apparatus (cornea, lens, and the refracting media), for instance, with closed eyelids or pupil, is still capable of causing quantitative perception of light, *i. e.*, the distinction between light and darkness, and colors, but incapable of causing qualitative perceptions, *i. e.*, the recognition of objects. Having cherished this idea, which was suggested by the functional analogy between the organs of our higher senses, Dr. K. was gratified by the exposition of this subject in the excellent recent treatise on the physiology of hearing, by Prof. Hensen (vol. iii, part 2, of Hermann's "Handbuch der Physiologie"), which may be summed up in the following sentence: "As the bone-conduction unquestionably in a very considerable degree enters the labyrinth through the apparatus of the drum-cavity, this process may appropriately be termed cranio-tympanal conduction. How far direct bone-conduction produces auditory sensations, is still unknown."

In support of his hypothesis, that bone-conducting conveys only quantitative, not qualitative impressions of sound to the acoustic nerve, Dr. Knapp mentions the following observations: (1) He never found a person who could hear his watch (of 24″ hearing distance) from any part of the skull, if he could not hear it on contact with the auricle.

(2) The audiphone, in his experience, never increased the hearing power more than a trumpet, commonly very much less.

(3) Patients with acute otitis media who could not hear the watch when applied to any part of the skull, and who had only quantitative perception of sound, *e. g.*, heard only an indefinite sound when words were hallooed into their ears, immediately after inflation by Politzer's method, heard the watch by bone-con-

duction and understood what was said from 5′ to 15′. As Politzer's inflation, Dr. K. argued, improves only the condition of the sound-conducting apparatus, and does not interfere with the bone-conduction in any way, it is evident that the bone-conduction, which was evidently preserved in such cases, is, of itself, insufficient to convey qualitative perceptions of sound.

Of the lengthy discussion which followed this paper, a remark of Dr. O. D. POMEROY, of New York, should not be omitted. Dr. P. said that he could not explain to himself the deafness in cases of acute otitis media, which was removed by Politzer's inflation, otherwise than by the presence of increased intralabyrinthine pressure which temporarily paralyzed the acoustic nerve, and that Politzer's experiment by forcing the stapes outward relieved that pressure, thereby making hearing, both bone and middle ear conduction, possible again.

Dr. KNAPP replied that the existence of increased intralabyrinthine pressure in such cases was merely hypothetical. Dr. Pomeroy's supposition of the paralysis of the acoustic nerve from pressure, in the case under consideration, was at variance with our general knowledge of the pathology of nerves. If, in other parts of the body, for instance, the eye, a nerve was paralyzed by continued pressure, say for hours, days or weeks, the nerve, if at all, does not resume its function immediately after the removal of the pressure. As the restoration of qualitative perception of hearing by Politzer's experiment is immediate, he thought it acted by removing a mechanical obstacle, mucus, etc., which by clogging or pressure interfered with the vibratility of the ossicles, and might, for instance, hold the stapes immovable in its niche.

The remainder of the meeting was occupied by *demonstration of instruments and specimens.*

Dr. J. O. GREEN showed a folding Politzer-bag, occupying little space. (To be had from Rich & Green, 1 Hamilton Place, Boston.)

Dr. O. D. POMEROY exhibited a metal *ear-syringe*, the conical nozzle of which was at its thicker end surrounded *with a flange* to guard against spattering.

Dr. ANDREWS, of Staten Island, showed an instrument *for blowing powder into the tympanic cavity.*

Dr. BLAKE exhibited a toothed forceps (like the fixing forceps of the eyeball), for removing collections of scales from the drum-cavity.

He also presented *pieces of an osseous labyrinth* (cochlea, walls of the vestibule), which had been *exfoliated* from the ear of a patient whose health was restored, but who lost his hearing.

Dr. Blake, further, made some remarks on the exostoses which he discovered in the ear-canals of the mound-builders. (See Am. Jour. of Otol., Vol. ii.) He found them in 47 among 300 skulls. A Boston pathologist suspected them to be of syphilitic origin, but no other evidences of syphilis could be found in the skeletons of the mound-builders.

AN ABSTRACT OF THE OTOLOGICAL PAPERS READ BEFORE THE SECTION OF OPHTHALMOLOGY, OTOLOGY AND LARYNGOLOGY AT THE 31ST SESSION OF THE AMER. MED. ASSO., HELD IN NEW YORK, JUNE 1–4. 1880.*

By Dr. SWAN M. BURNETT, of Washington.

Dr. B. Pope, the chairman, not being present, Dr. Turnbull of Philadelphia, was called to the chair.

During the first day no otological papers were offered.

SECOND DAY.

Dr. S. J. Jones, of Chicago, read a paper on the *introduction of liquids into the Eustachian tube and middle ear.*

Dr. J. has been introducing fluids into the middle ear by way of the Eustachian tube for 9 years, and has found it of great advantage in any chronic, non-suppurative inflammation of the middle ear. He uses principally solutions of borax, chlorate of potash, etc. at the temperature of the blood. The solution should be thrown in gently. He thinks, too, the effect of sea-bathing in causing inflammation of the middle ear is greatly over-estimated. In a service of over ten years as a naval surgeon his experience has taught him that wet decks were much more provocative of "earaches" among sailors than bathing in the sea.

Dr. Richey, of Washington, agreed with the speaker as to the value of intra-tympanic injections. He always uses them warm,

* This abstract is made up from notes taken at the time and from the report in the *N. Y. Medical Record.*

and in 5 years has never had an inflammation follow. When there has been any inflammation it has resulted from general causes as indicated by an initiatory chill.

Dr. KNAPP being asked by the president, stated that his experience would not allow him to coincide with the views of Dr. Jones.

Dr. CHISHOLM of Baltimore said his views agreed with those of Dr. Jones, provided the temperature was right. He has found pain and inflammation to result from astringents, and now uses only the weak solutions of muriate of ammonia, bicarbonate of soda, etc., always warmed.

Dr. NOYES of Detroit had one very successful case where the bulging *Mt* was punctured and the drum cavity was washed out by way of the tube. In other cases he had not been so happy and has now abandoned intratubal injections. He has seen several cases of inflammation of the middle ear after using the nasal douche.

Dr. REYNOLDS of Ky. said tubal injections should be limited to cases where there is sloughing of the drum membrane.

Dr. POMEROY said his opposition to the intratympanic injections was well known. In certain cases—as of proliferatory catarrh—he treats the mouth of the tube alone, but with strong solutions.

Dr. CHISHOLM in over 1,000 injections into the tube had not met with over five or six cases of inflammation. His method of getting fluids into the tympanum is to inject the fluid into the posterior nares and then drive it into the drum cavity by inflation with the bag.*

Dr. HOLCOMBE does not any longer use liquid injections, but uses instead iodized vapors.

THIRD DAY.

Dr. BURNETT of Washington in the chair.

Dr. KNAPP presented a patient whom he had treated for *perichondritis auriculæ* with a history of the affection. The case is reported in full detail in this number of the ARCHIVES, p. 196.

DR. POOLEY stated that he had seen a case of this nature which he had treated with continuous pressure, and with the effect to arrest the course of the disease and with less resultant deformity.

* Is it possible to get any quantity of fluid into the drum cavity in this manner? *Rep.*

Dr. Mackay of Wilmington had treated a case of this nature by application of nitric acid which seemed to have a marked effect on the course of the affection.

Dr. Risley of Philadelphia had a case now under observation which he was sure was of this nature. He had, however, seen the case but once; there was a discharge of pus through several openings.

Otological contributions by Dr. S. D. Risley of Philadelphia: 1st, *Inflammation of the mastoid with meningeal complication.* The mastoid was opened and with good care the patient's life was saved: 2d, *Cases of inspissated cerumen*, in one of which there were symptoms of meningeal compression, in one, those of locomotor ataxy, and in another those of a reflex character.

The following were read by title for want of time:

"*Observations with cases of auditory vertigo*," by Dr. L. Turnbull, and a paper on "*Disease of the middle ear*," by Dr. W. F. Holcombe of N. Y.

QUARTERLY ABSTRACT OF AMERICAN OTOLOGICAL LITERATURE.*

FOR THE SECOND QUARTER OF 1880.

By SWAN M. BURNETT, of Washington.

1. On the evil consequences of neglected colds in the head. By D. B. St. J. Roosa. *Med. Gazette*, Feb. 20.

Dr. R. in this lecture lays particular stress upon the early and prompt treatment of colds in the head as the best preventive measure against certain intractable inflammations of the middle ear and of the lachrymal apparatus.

2. An instrument for making applications of medicated fluids and powders to the middle ear. By J. A. Andrews. *Archives of Med.*, April.

The instrument consists of a delicate platinum or silver tube, 11 *cm.* long and 1 *mm.* in diameter, with a knob at one end to which is fitted a rubber cap like that of a pipette. The instrument is especially designed to throw fluids into the middle ear through small perforations in the *Mt* when they are situated in the upper portion of the membrane. It has also a larger tube with a hollow bulb attached, which is used for blowing powders into the middle ear.

3. On the affections of the middle ear during the early stages of syphilis. By F. R. Sturgis. *Bost. Medical & Surgical Journal*, June 3.

Three cases are detailed. In Case 1 there was acute middle ear catarrh, not associated with any marked throat trouble. He looks upon the nocturnal occurrence of pain as suspicious, at least, of its syphilitic origin, not being aware, probably, that, as a rule, the pain in acute catarrh is worse at night. He also regards the infiltra-

*Authors of papers are requested to send one copy to the editor, Dr. H. Knapp, 25 W. 24th Street, New York, and another to Dr. Swan M. Burnett, 1215 I Street, Washington, D. C

tion of the tympanum, conjoined with the absence of vascular congestion, as having the same significance. In Case 2 there was a pharyngitis conjoined with the middle ear trouble. In Case 3 an acute attack was grounded on an old otitis media purulenta in a syphilitic patient, some of the symptoms of which were no doubt due to that disease.

4. Earache caused by acute catarrh of the middle ear.

At a meeting of the St. Louis Medical Society, reported in the *St. Louis Medical & Surgical Journal*, February 5th, T. F. RUMBOLD read a paper on the treatment of earache caused by acute catarrh of the middle ear. He envelopes the head in cotton batting, gives a foot bath, places the patient in bed and brings on profuse perspiration, as preventive measures in the preliminary stage. If the pain is pronounced, he instils a mixture of laudanum, from which the alcohol has been driven off by heat, and glycerine. This is dropped hot in the ear, and the canal closed by cotton dipped in the same. The head is then enveloped in cotton, and a hot brick enveloped in wet cloths applied to the side of the head. If this fails he gives an emetic of mustard and salt, and should this not give the desired relief, the *Mt* is punctured. He does not think such a thing as idiopathic myringitis exists. Dr. WILLIAMS has satisfied himself that there is an acute idiopathic myringitis, and in the treatment of such cases he had had the happiest results from solutions of sulphate of atropia dropped—not necessarily warm—into the ear.

5. The importance of the early recognition of ear disease. By J. ORNE GREEN. *Bost. Medical & Surgical Journal*, July 1st.

It is impossible to do this very admirable paper justice in a short abstract. It is addressed to the general practitioner and the laity rather than the specialist, and is a forcible presentation of the necessity of an early recognition and treatment of inflammatory ear diseases, and of the fact that chronic catarrhs of the ear are much more easily prevented than cured.

REPORT ON THE PROGRESS OF OTOLOGY

IN THE SECOND HALF OF THE YEAR 1879.

(Continued from Vol. ix, p. 188.)

IV.—PATHOLOGY AND THERAPEUTICS OF THE EAR.

By A. HARTMANN, of Berlin.

Translated by R. C. Brandeis, M.D., of New York.

MIDDLE AND INTERNAL EAR.

20. L. Theobald, Baltimore. The value of atropia in the treatment of acute inflammations of the middle ear. The *Amer. Journ. of Otology*, No. 3, 1879.

21. Pierre Giffo. Remarks on hay-fever, especially as to its connection with inflammations of the ear. *Annal. des Mal. de l'Oreille*, etc., No. 5, 1879.

22. Wemyss Bogg. Case of supposed deaf-mutism, closure of Eustachian tube, moist catarrh of tympanic cavity; cure. *Lancet*, July 12, 1879.

23. Ed. Woakes, London. Throat deafness associated with paresis of the palato-tubal muscles. The *Amer. Jour. of Otol.*, No. 4, 1879.

24. S. Moos, Heidelberg. Surprisingly increased acuity of hearing for low tones, in a case of paralysis of the right facial nerve. Arch. of Otol., vol. ix, p. 23.

25. Hicks. A case of acute inflammation of the middle ear, with symptoms of meningitis, paracentesis of the drum membrane; complete recovery. The *Amer. Jour. of Otol.*, No. 3, 1879.

26. S. Moos, Heidelberg. A case of loss of taste after extirpation of a polypus, arising from the region of the stirrup. Arch. of Otol., vol. ix, p. 35.

27. Louis Blau, Berlin. A contribution to the theory of the function of the chorda tympani. *Berl. Klin. Wochenschr.*, No. 45, 1879.

28. R. Schalle, Hamburg. A simple method of treatment of purulent aural discharges. *Berl. Klin. Wochenschr.*, No. 32, 1879.

29. H. N. Spencer, St. Louis. Iodoform and alum in aural therapeutics. The *Amer. Jour. of Otol.*, No. 4, 1879.

30. A. Hartmann, Berlin. Cleansing the tympanic cavity and its sinuses. *Deutsche Med. Wochenschr.*, No. 44, 1879.

31. V. Urbantschitsch, Vienna. Chronic purulent inflammation of the tympanum and its importance. *Wiener Klin.*, vol. v, No. 8.

32. S. Moos, Heidelberg. Extirpation of the entire malleus with a polypus arising from its manubrium. Arch. of Otol., vol. ix, p. 28.

33. I. Michael, Hamburg. Otitis media purulenta, with necrosis of the inner tympanic walls, etc. *Arch. f. Ohrenheil.*, vol. viii, p. 300.

34. J. Gruber, Vienna. Necrosis of the temporal bone. *Monatsschr. für Ohrenheil.*, No. 10, 1879.

35. Emil Gruening, New York. On the indications for opening the mastoid process in acute otitis media purulenta with implication of the mastoid cells. Arch. of Otol., vol. viii, p. 84.

36. A. G. Gerster, New. York. A case of extensive caseous ostitis of the mastoid process and petrous bone. *Ibidem*, p. 81.

37. Gelitte. Otitis media in a tuberculous subject; extension to the mastoid process; trepanation; auriculo-mastoid drainage. Cure. *Annal. des Mal. de l'Oreille*, etc., No. 5, 1879.

38. Tomasso Bubone. On the diseases of the soft and bony tissues of the mastoid region, etc. *Estratto dall' Osservatore, Gazetta delle Cliniche di Torino*, 1879.

39. C. J. Kipp, Newark, N. J. Four cases of intracranial disease, caused by chronic suppuration of the middle ear. Arch. of Otol., vol. viii, p. 147.

40. J. Orne Green, Boston. Phlebitis of the venae emissariæ mastoidæ. The *Amer. Jour. of Otol.*, No. 3, 1879.

41. H. Steinbrügge, Heidelberg. Cholesteatoma of the right temporal bone, perforating into the region of the semi-

circular canals. Cerebral abscess. *Post-mortem.* ARCH. OF OTOL., vol. ix, p. 21.

42. I. MICHAEL, Hamburg. Chronic purulent otitis media and cerebral abscess independent of each other. *Arch. f. Ohrenheil.*, vol. viii, p. 303.

43. TOMASSO BUBONE. A case of acute meningitis with thrombosis of the cerebral sinus,(?) due to a chronic otitis media purulenta. *Estratto dall' Osservatore, Gazetta delle Cliniche di Torino*, 1879.

44. THOS. BARR. Purulent discharges from the ear ; cerebral abscess. Glasgow Pathol. and Clin. Society. The *British Med. Journ.*, Nov. 8, 1879.

45. M. VARRIOL. Contusion of the lower portion of the temporal lobe of the brain, due to a gun-shot wound of the petrous bone. *Gazette Médic. de Paris*, July 5, 1879.

46. M. ASSAKY. Cancer of the middle ear and petrous bone. Destruction of a part of the base of the skull and of the atlas. *Annales des Mal. de l'Oreille*, etc., No. 5, 1879.

46a. GEO. T. STEVENS. A case of tumor of the auditory nerve, etc. ARCH. OF OTOL., vol. viii, p. 171.

47. A. HARTMANN, Berlin. A case of round-celled sarcoma originating in the tympanic cavity. *Ibidem*, vol. ix, p. 49.

48. J. P. CASSELS, Glasgow. Clinical report of three cases of malignant ear disease, treated in the Glasgow dispensary for diseases of the ear. *Glasgow Medical Journal*, December, 1879.

49. M. BONNAFONT. Some pathological conditions of the tympanic cavity, which give rise to nervous symptoms, ascribed by Flourens and Goltz exclusively to the semicircular canals. *Comptes rendus de l'Acad. des Sciences*, Nov. 3, 1879.

49a. KESSEL, GRAZ. Exsection of the membrana tympani and mobilization of the stapes. Reprint from the *Oesterr. Aertzl. Vereinszeitung.*

20. THEOBALD, bearing in mind the beneficial influence which atropine exerts upon some affections of the eye, determined to employ this remedy in aural affections, and satisfied himself that it was also of great service in these affections. He occasionally found this remedy beneficial in diseases of the external ear, but it was most useful in acute inflammations of the middle ear accompanied with great pain, especially in children ; also in the severe forms of otitis media resulting from the exanthemata.

Theobald advises the instillation into the meatus of from 9 to

10 drops of a four-grain solution; this is to remain from ten to fifteen minutes; if necessary, this application may be repeated every three to four hours. If the drum membrane was intact, Theobald never found any constitutional effects. In a case where the membrana tympani was perforated, and where the instillation had been repeatedly made, there was, in a little girl, aged 3 to 4 years, dilatation of the pupils. But Theobald is not quite sure whether there might not have been a direct application of the atropine to the eyes of the child.

Theobald satisfied himself of the beneficial effects of atropia in the case of his own child.

21. GIFFO endorses the views of Ladreit de Lacharrières about those affections of the ear met with in hay fever. According to the latter, these are due to tubal obstructions and catarrhal otitis, which are due to catarrh of the nasal mucous membrane.

22. BOGG, while examining a child of five years, which was considered a deaf-mute by its relatives, found that there was some hearing power manifest. The history showed that the deafness had appeared after an attack of scarlet fever at the eleventh month. On examination, the child hears words uttered in a very loud voice, and is able to pronounce indifferently above twenty words, but cannot express herself further, nor can she decipher speech. The drum-heads are opaque on both sides. After the first application of the air-douche there was already some improvement of hearing, which continued to mend with every application, so that the child was soon able to acquire speech with considerable rapidity. Bogg considers the above as a moist catarrh of the tympanic cavity with collapse of the Eustachian tube. By means of the air-bag the secretions contained in the tympanic cavities were removed and the mucous membrane restored to its normal condition.

23. WOAKES tabulates the symptoms of throat deafness as follows: Negative appearances of the drum-head; occasional collapse of the membrane. Catheterization can be performed without difficulty, but, on the other hand, Valsalva is generally futile. The condition of the soft palate is the most important symptom; it hangs pendulous with a plane surface; the uvula can only be seen with difficulty. Its appearance is thin and relaxed, and it is sensitive to the touch; in unilateral paresis the symptoms are most marked. The hearing of the patients is variable; they generally hear

best in the morning. Anæmic persons are most commonly affected after severe physical and psychical labor. Woakes thinks that the cause must be sought for in the sympathetic system, owing to a deficiency of the vaso-motor excitability, and thinks that the congestion of the vessels lying in the sheaths of the nerves exerts a mechanical pressure upon the motor nerve fibres.

The treatment should be such as to build up the system, and such remedies should be exhibited which tend to increase the power of the ganglia to constrict the vessels. Woakes gives iron, phosphorus, hydrobromic acid, and cod liver oil. He has also had good results from the use of carbonate of ammonia (4 grs. at a time) thrice daily. The application of the induced current will facilitate a cure, one electrode to be applied to the posterior surface of the soft palate, the other behind the angle of the lower jaw above the upper cervical ganglion.

25. HICKS had a patient suffering from acute otitis media, in whom cerebral symptoms and fever manifested themselves as soon as the discharge ceased.

Five weeks after the first manifestations appeared, a cure was accomplished by incision of the inflamed, distended membrana tympani allowing the exit of the pus which had accumulated in the tympanic cavity.

28. SCHALLE, having frequently observed that the use of the syringe did not suffice to thoroughly cleanse the ear, and fearing an unfavorable influence of the syringing upon the epithelium and the underlying tissues, makes use of a piece of lasting about 10 *cm.* long; it is linted at one end so as to form a sort of a brush, and the ear is then cleansed with it. This done, the part covered with pus is cut off and the process is repeated again and again until the ear is quite clean, when medicated instillations are made.

29. SPENCER has achieved very good results in swelling and granulations of the tympanic mucous membrane by the use of iodoform. He reports several cases, in which the usual medicaments availed nothing, which were cured by iodoform. His remarks about alum contain nothing new.

31. URBANTSCHITSCH'S paper on chronic purulent inflammation of the tympanum, intended mainly for general practitioners, contains a careful summary of everything noteworthy on the subject. The accompanying phenomena as well as the complicating

diseases are described in detail. The diagrammatic drawings afford a good view of the anatomical relations.

34. GRUBER reports the case of a girl, aged 10, in whom there was a purulent otitis media with formation of an abscess behind the ear after scarlet fever; a few months afterward a physician removed a piece of bone, after which a cure set in. Later, when Gruber examined it he found in the mastoid region a bony depression covered by a thin cicatrix. The external meatus was somewhat contracted and there was cicatricial tissue in the place of the tympanic membrane. The sequestrum was 3 *cm.* long, 3.7 *cm.* broad, and 1.5 *cm* thick. The outer part consisted of the entire mastoid process to the masto-squamous fissure, the inner part consisted of the mastoid process adjacent to the petrous bone. On the posterior surface there is a long part of the sigmoid sulcus with a smooth surface. Gruber attributes the cure to a new formation of bone, and considers it very striking that so large a part of the sigmoid sulcus can be exfoliated without any disturbance in the venous circulation.

37. GILLETTE'S patient suffered from divers tuberculous affections besides purulent otitis. Inflammatory symptoms manifested themselves in the mastoid region, and owing to severe pains, it was deemed advisable to open the antrum; which was done in the usual manner, and resulted in a cure of the case.

38. BUBONE gives us in his treatise a very elaborate and complete view of the diseases of the mastoid process and their treatment. His ideas are mainly based on German teachings. The indications for trepanation of the mastoid are discussed at length.

In Prof. BRUNO'S clinique at Turin seven cases were operated on. In each of them there was an abscess of the mastoid region and either caries or necrosis of the bone. In four cases the operation was done by means of hammer and chisel, as well as with the sharp spoon; in two cases the spoon only was employed, and in one case Wilde's incision sufficed.

40. GREENE reports three cases, in the first after a severe acute otitis an abscess about the size of an egg was found upon the mastoid process. An incision having been made, swelling and œdema set in, which extended over the neck on the affected side. There were also œdema of the eyelids and formation of abscesses in the neck and occipital region. Death ensued 17 days after the swelling set in, owing to cerebral symptoms.

In the second case swelling of the neck set in after an acute otitis media had subsided; this began on the mastoid process. There were pain and œdema along the course of the jugular vein, and facial erysipelas; death occurred 36 days after the swelling first appeared. In the third case a painful swelling of the mastoid region set in after a severe cold, with chronic otitis media, delirium; intense fever and subcutaneous hemorrhages were also found; death after two days' suffering. No *post-mortem* examinations were made.

Otitis media with formation of polypi. After suffering from cerebral complications, and vomiting, pain and convulsions, death ensued on the tenth day. There was carious destruction of the vault of the tympanum and a perforation of the dura mater near the transverse sinus. Also abscess of the temporal lobe of the brain.

45. VARRIOL reports the case of a young man in whom a pistol ball had penetrated the cranium below the external auditory meatus. Consciousness was not impaired at any time, but there was a complete deafness, without any facial paralysis or any other sensory or motor disturbance. The patient died suddenly two days after the accident. On *post-mortem* the petrous bone was found to be splintered throughout and the entire internal ear destroyed; there was, besides, an injury of the carotid artery and of the temporal lobe.

46. ASSAKY's case of carcinoma of the middle ear occurred in the person of a woman aged 30 years, who had suffered from purulent otitis since she was three years of age. When admitted into the hospital there were complete deafness on the right side, swelling of the mastoid region, and a purulent discharge. The meatus was filled with new granulation tissue. The auricle was soon displaced by the swelling, and became œdematous, and began to suppurate. Facial paralysis, dysphagia, aphonia, and dyspnœa, as well as cardiac irregularities and intense pains, soon manifested themselves; intellection remained unimpaired. The patient succumbed to the intense cachexia.

At the autopsy the right, middle, and posterior temporal sulci were found to be filled by a cancerous mass, the dura mater adherent to the brain, which was atrophied to correspond with the neoplasm. The larger part of the temporal bone was destroyed; the atlas had completely disappeared; the odontoid process projected into the foramen magnum. The condyle of the lower jaw

was bare of cartilage. Besides this there were extensive destruction and granulations of the soft parts of the neck.

48. CASSELS reports three cases of sarcoma. All of them were found on the left side. The first two were round and spindle cell sarcomata ; the third simply a spindle cell growth with an epidermal envelope. Only the third case could be examined after death. The first was that of a lady aged 51 years, the second occurred in a man of 44, and the third in a boy 4 years of age.

49. BONNAFONT describes a number of pathological observations concerning the semicircular canals. In two cases, in which, owing to a chronic otitis media purulenta, the ossicula auditus, with the exception of the stapes, had been lost. Vertigo always set in after repeated touching with a probe. In another case meningeal appearances had set in after an acute angina. There were headache, tinnitus, vertigo, loss of coördination and emesis ; the latter symptom recurred after intervals of 3–4 days. After catheterization, marked improvement. Bonnafont inclines to the belief that the vertiginous symptoms were due to the pressure exerted on the vestibule and the semicircular canals by the stapes.

49a. KESSEL'S reports, two years ago, having failed to elicit any communications on the operation then proposed by him, he reverts to them in his interesting paper, and will, undoubtedly, therefore, attract greater attention to his proposal.

" The indications for the excision of the membrana tympani and for the mobilization of the stapes are generally at hand when the apparatus of the middle ear has become useless (*i. e.*, if it does not vibrate), impinges on the incompressible labyrinthine fluid, and if aural noises manifest themselves to an alarming degree.

" 1. In incurable occlusion of the Eustachian tubes.

" 2. In entire calcification of the drum-membrane, combined with difficulty of hearing and a normal acoustic nerve.

" 3. In caries of the bones of the middle ear.

" 4. In anchylosis of the stapes and distressing tinnitus.

" 5. In cholesteatoma of the tympanum and of the mastoid process, which cannot be removed in the usual manner."

The perception of speech will only return after the nerve again begins to react to tones of eight octaves (C^2—C^5) and we have succeeded in freeing the plate of the stirrup.

Kessel performs the operation as follows : The patient being narcotized, the drum-membrane is entirely detached from its per-

ipheric adhesions, and is, after tenotomy of the tensor tympani, removed with the malleus. The latter is done by means of a snare which is passed around the neck. In young patients the cartilaginous ring of the posterior upper quadrant is also removed in order to prevent a regeneration of the membrana tympani.

Kessel presented three patients who had been operated on by him, as above.

In the first case there was sclerosis of the tympanic, mucous membrane, with anchylosis of the articulations of the ossicula auditus. Removal of drum-membrane and malleus. There was no perception of speech previous to the operation; after that, there was, if the speaking tube was used. The second case was that of a woman with otorrhœa and inability to hear the voice. Malleus and incus and a remainder of the drum-membrane were removed. Cure and perception of speech at one meter distance. In the third case, deafness had become so great in the course of two weeks that the voice could not be distinguished, and the only vowel which could be heard was *a*. Besides this, there were intense subjective noises and abnormal psychical phenomena. Excision of the drum-head and of the handle of the malleus. The stirrup was found to be movable, and was left *in situ*. After discharge, conversation could be followed at a distance of several meters.

NOSE AND NASO-PHARYNX.

50. M. RICHET, Hotel Dieu. Distortion of the septum narium with exostosis. *Gazette des Hospitaux*, No. 122, 1879.

51. JOHN COCHRANE, Edinburgh. Case of epistaxis complicated by an epileptiform seizure. The *Brit. Med. Journ.*, Aug. 2, 1879.

52. GOTTSTEIN, Breslau. On the pathology and therapeutics of ozæna. *Bresl. ärztl. Zeitschr.*, Nos. 17 and 18, 1879.

53. F. TRAUTMANN, Berlin. Contributions on those diseases of the nose in which the ear is also affected. *Arch. f. Ohrenheilk.*, Vol. xv, p. 91.

54. HARRISON. Note on the treatment of mucous polypus of the nose. The *Brit. Med. Journ.*, Nov. 15, 1879.

55. ARTHUR HARTMANN, Berlin. The removal of nasal polypi. *Deutsche Med. Wochenschr.*, No. 28, et seq., 1879.

56. E. ZAUFAL. The plica salpingo-pharyngea. *Arch. f. Ohrenheil.*, vol. xv, p. 96.

57. M. SCHÄFFER, Bremen. The removal of adenoid growths. *Monatsschr. f. Ohrenheilk.*, No. 7, 1879.

58. R. VOLTOLINI, Breslau. Rhinoscopy and pharyngoscopy. 2d edition, vol. ii.

59. E. DE ROSSI. Naso-pharyngeal polypi and pharyngo-rhinoscopic electrolysis. Rome, 1880.

60. MILLER, Edinburgh. The treatment of mucous polypus of the nose. *Brit. Med. Journ.*, Dec. 13, 1879.

61. The use of Weber's nasal douche. *Ugeskrift fur Laeger*, 3, Keihl xxvii, Nos. 29 and 30, 1879.

50. RICHET has seen ten or twelve instances of deviation of the nasal septum to the left side, causing occlusion of the corresponding nasal fossa. In seven there were swellings 10–12 *mm.* in height, and these were classed as exostoses. The reason why in all the cases reported there was a deviation to the left is explained by M. Richet as follows: When children's noses are wiped, the nose is always turned to the left. (?) The exostoses were bony only in those cases operated on, in the others they were of a cartilaginous nature.

51. COCHRANE'S case was one of persistent epistaxis. Injections of chloride of iron were made without effect, but as soon as pieces of lint soaked in the solution were forced into the nasal fossæ, the hemorrhage ceased. Shortly after, the patient suddenly fainted and was seized with convulsions of an epileptiform nature. The author thinks these were due to absorption of the iron.

52. GOTTSTEIN has seen, since the publication of his first paper (see these reports, vol. viii), twelve new cases of ozæna which presented the characteristic appearances of the diseases described by him as rhinitis chronica atrophicans. In only two of them was there any scrouflous taint. In none were there any signs of syphilis. The sister and the uncle of one of the patients were also afflicted with ozæna. Two of the cases had what Gottstein terms "saddle noses," *i.e.*, depressed bridges. It is remarked that "saddle noses" may also be found where there is no trace of ozæna. Nothing could be learned as to the origin or beginning of the disease. Gottstein adheres to his former assertion, that the scabs and fœtor only arise from a degenerated mucous membrane; wide or dilated nasal fossæ have nothing to do with it. Simple fœtid rhinitis must be considered as a disease *sui generis*, and can be differentiated from dyscrasic affections

by its clinical history, the nature of the fœtor as well as by the anatomical conditions. Gottstein is confirmed in his views as to the nature of the treatment to be pursued by the study of these new cases.

53. TRAUTMANN reports two cases in which there was a fœtid, chronic discharge from the nose, with swelling of the mucous membrane, due to the formation of a sequestrum which had affected the alveolar processes. There was also deafness of the affected side. Tbe symptoms disappeard after the removal of the fragments of dead bone.

54. HARRISON punctures nasal polypi with a trocar and allows the accumulated serum to flow off. In order to prevent any reaccumulation, solutions of carbolic acid and glycerine are injected into the nasal cavities.

55. HARTMANN discusses the various operations for the removal of nasal polypi by the light of his personal experience. He employs the wire snare already described by him, which differs from Blake's instrument inasmuch as the wire can be drawn into the canula, which thus increases the chances of separation of the growth. If there be a very considerable polypoid formation, the author urges the removal of the secured portion ; the extirpation will thereby be facilitated and thorough. The remaining stumps were destroyed by the galvano-cautery. Those cases which presented some unusual complications are reported in detail.

56. ZAUFAL, having already published his preliminary remarks on the plica salpingo-pharyngea (see last report, vol. viii), now gives us a detailed description of the same. It is clearly demonstrated that by the means of the different methods of examining the naso-pharynx, the plica salpingo-pharyngea can also be brought into view. The views already advanced by Tourtual, Passavant, Luschka and Michel, are confirmed, in the main. The different diseases which affect this fold are discussed at length. They are marked swellings, the development of cystoid follicles, which may occlude the ostium tubæ. Zaufal has also observed gummata on these folds.

57. SCHÄFFER, although he considers the forceps recommended by Löwenberg and Catti as well adapted to the needs of general practitioners, thinks that for special treatment the hollow galvanocaustic chisel of Voltolini is preferable. Nearly all proliferations can be removed in from 5 to 15 sittings. Schäffer has frequently operated without the aid of the mirror, and has never injured any

of the adjacent parts. The number of cases treated by him was 49.

58. VOLTOLINI, in the seventh chapter of the second half of his monograph (see report, vol. viii), treats of the digital examination of the naso-pharynx as well as the inspection of it through the anterior nares.

Two photographic views are given to prove that the ostium tubæ cannot be viewed in this manner. Chapters viii and ix are devoted to the examination of the naso-pharynx by means of double mirrors. Chapter **X** treats of "physiological observations gained by rhinoscopy." These refer especially to the occlusion of the upper from the lower pharyngeal cavity during deglutition and phonation. In the last chapter we note especially a pharyngeal speculum which Voltolini employs during galvano-caustic operations in that cavity.

59. DE ROSSI, after giving us a very elaborate historical introduction on fibrous naso-pharyngeal polypi, describes a method of removal employed by him in two cases. De Rossi removes this by electrolysis by means of the galvano-cautery. If the rheophores are not brought in contact with the healthy parts no pain will be caused. A strong, reliable battery is needed, whose current can be increased or weakened without interruption. In both of the cases operated on the tumors started from the base of the skull. One of the tumors, which was the size of an egg, contracted gradually into a very dense, small prominence of cartilaginous texture. In 5 years no relapse. In the second case, a tumor about the size of a pigeon's egg sloughed away and thus disappeared entirely.

60. MILLER appends to Harrison's (54) communication a note that he has also succeeded in destroying mucous polypi by spraying them with rectified spirits of wine.

61. LAUP gives a detailed description of Weber's nasal-douche and its mode of employment. The indications and contra-indications are discussed in detail.

V. PHYSIOLOGY OF THE EAR AND PHYSIOLOGICAL ACOUSTICS.

BY OSCAR WOLF, OF FRANKFORT-ON-MAIN.

1. CLARENCE J. BLAKE, Boston. Audibility of high musical tones. The *Amer. Journ. of Otol.*, vol. i., No. 6.

2. PLUMANDON. A curious acoustic illusion. *The Telegraphic Journal*, London, September 15, 1879.

3. W. PREGER, Jena. The acumetric application of Bell's telephone. *Journal of the Society for Medecine and Natural Science*, Jena, February 21, 1879.

4. E. HOSPITALIER, Paris. The audiometer. *The Electric Light*, Paris, vol i., No. 3.

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1. BLAKE, in order to complete the observations on the perception of high musical tones already made by him and Turnbull (see these ARCHIVES, vol. ix., No. 1), extended his experiments to persons having a defective conductive apparatus. It was found that patients having a perforate drum membrane perceive the higher and highest tones of the scale relatively with more ease than the lower ones. Blake also found the upper tone-limits of such persons higher than the average in those having normal hearing; so that as many as 100,000 (single) vibrations per second could be heard. If there was still purulent discharge from or swelling of the mucous membrane of the tympanum, the limit of hearing is not so great. The experiments were made by means of Koenig's steel rods and a series of Galton's whistles, which varied from 6,000 to 84,000 vibrations. Blake explains the improved hearing of high tones in his patients by the fact that the system of the drum membrane and chain of bones, by the weight of its mass, exerts a certain degree of obstruction to the vibrations of the highest tones. If, now, this chain, or a portion of it, be removed, then the upper limit of hearing must ascend. Increased resistance, such as thickening or calcification, or increased tension of this system, will diminish the perception of higher tones. These assertions agree with those made by Woods, Guerder and Turnbull and are of value, but the reporter is sceptical as to the value of such physiological deductions which are based on unsatisfactory data.

The reporter is not convinced that pieces of paper attached to the remaining portion of the membrana tympani on one side, and to the process of the incus on the other, can have the effect that the sound moves, to the exclusion of the malleo-incudal joint, must pass directly from the drum head to the stapes. If such patients hear better after this has been done, it is more probable that the increased perception is due to the pressure, which causes a more exact co-aptation, as do the artificial membranes.

2. PLUMANDON and others have made some interesting acoustic experiments in the observatory of Ruy de Dôme. As is well known, when the telephone is held to the ear, the voice appears to come from some distance on the corresponding side. If, however, telephones are placed on both ears, and if, for instance, the right ear is less sensitive than the left, the sound of the voice will pass to this side, and the source of sound will be searched for on the left. If two telephones are placed on two ears hearing equally well, the sound seems to come from in front.

3. PREGER, influenced by the fact that ophthalmology has long since been in possession of a reliable method of measuring vision and that otriatry, previous to the invention of the telephone, has not had a reliable standard, proposes an acumeter which shall not possess the errors of Hughes' and Hartmann's methods. None of the elements heretofore connected with the telephone have either been weak or stabile enough, for in every case those having normal hearing in spite of the considerable resistance after insertion of the various blocks, have already heard the closing and opening tickings. He has, therefore, constructed another element, which gives such a weak current that the rack must be moved from 10–20 *cm.* so that even the most acute ear can hear anything. This element consists of small pieces of platinum and zinc, which are kept at a certain distance and are immersed in a solution of zinc and vitriol and are connected with the rheophore by means of short wires.

4. HOSPITALIER'S report is only a repetition of the description of Hughes' audiometer (see these ARCHIVES, vol. viii), and of Richardson's experiments, to which a short series of the author's are appended.